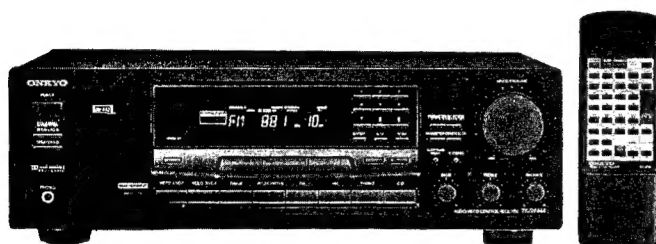


# ONKYO® SERVICE MANUAL

## QUARTZ SYNTHESIZED TUNER AMPLIFIER MODEL TX-SV444 / MODEL TX-SE500

**Black model**

|          |                          |
|----------|--------------------------|
| BMD/BMDN | 120V AC, 60Hz            |
| BMP      | 230V AC, 50Hz            |
| BMW      | 120V or 220V AC, 50/60Hz |

**Black and Golden models**

|         |                          |
|---------|--------------------------|
| BMP/GMP | 230V AC, 50Hz            |
| BMW/GMW | 120V or 220V AC, 50/60Hz |

### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  $\Delta$  ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.



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## SPECIFICATIONS

## AMPLIFIER SECTION

## Power Output

## Stereo mode

Front L/R channels: 70 watts per channel, min. RMS at 8 ohms, both channels driven from 20 Hz to 20 kHz with no more than 0.08% total harmonic distortion.

Continuous Power output: 2 x 80 watts at 8 ohms, 1 kHz (DIN)  
Surround mode

Front L/R and Center channels: 60 watts per channel, min. RMS at 8 ohms, both channels driven from 20 Hz to 20 kHz with no more than 0.08% total harmonic distortion.

Rear channels (Rear only driven): 20 watts per channel, min. RMS at 8 ohms, both channels driven from 20 Hz to 20 kHz with no more than 0.3% total harmonic distortion.

Total Harmonic Distortion: 0.08% at rated power (Front)

IM Distortion: 0.08% at rated power (Front)

Damping Factor: 60 at 8 ohms (Front)

## Sensitivity and Impedance

Phono: 2.5 mV/50 kohms

CD, Multi-CH, Tape Play: 150 mV/50 kohms

Tape Rec: 150 mV/2.2 kohms

Subwoofer Pre out: 2 V/2.2 kohms

Phono Overload: 120 mV RMS at 1 kHz, 0.5% T.H.D.

Frequency Response: 20 Hz to 30 kHz,  $\pm 1$  dB

RIAA Deviation: 20 Hz to 20 kHz,  $\pm 0.8$  dB

## Tone Control

Bass:  $\pm 10$  dB at 100 Hz

Treble:  $\pm 10$  dB at 10 kHz

## Signal-to-Noise Ratio

Phono: 80 dB (IHF A, 5 mV input)

CD/Tape: 100 dB (IHF A)

## VIDEO SECTION

Signal sensitivity and impedance: 1 Vp-p, 75 ohms (VDP/VCR input, output)

## TUNER SECTION

## FM

Tuning Range: 87.5 — 108.0 MHz

## Usable Sensitivity

Mono: 11.2 dBf, 1.0  $\mu$ V (75 ohms)

Stereo: 18.2 dBf, 2.2  $\mu$ V (75 ohms)

## 50 dB Quieting Sensitivity

Mono: 18.2 dBf, 2.2  $\mu$ V (75 ohms)

Stereo: 39.2 dBf, 24  $\mu$ V (75 ohms)

Capture Ratio: 1.5 dB

## Image Rejection Ratio

U.S.A. & Canadian models: 40 dB

Other area models: 85 dB

IF Rejection Ratio: 90 dB

## Signal-to-Noise Ratio

Mono: 73 dB

Stereo: 67 dB

Alternate Channel Attenuation: 55 dB

Selectivity: 50 dB (DIN)

AM Suppression Ratio: 50 dB

## Total Harmonic Distortion

Mono: 0.15%

Stereo: 0.25%

Frequency Response: 30 Hz — 15 kHz,  $\pm 1.5$  dB

Stereo Separation: 45 dB at 1 kHz

30 dB at 100 Hz — 10 kHz

## AM

## Tuning Range

U.S.A. & Canadian models: 530—1,710 kHz (10 kHz steps)

European & Australian models: 522—1,611 kHz (9 kHz steps)

Worldwide models: 531—1,602 kHz (9 kHz steps), 530—1,710 kHz (10 kHz steps)

Usable Sensitivity: 30  $\mu$ V

Image Rejection Ratio: 40 dB

IF Rejection Ratio: 40 dB

Signal-to-Noise Ratio: 40 dB

Total Harmonic Distortion: 0.7%

## GENERAL

## Power Supply

U.S.A. & Canadian models: AC 120 V, 60 Hz

European & Australian models: AC 230 V, 50 Hz

Worldwide models: AC 220-230 V and 120 V switchable, 50/60 Hz

## Power Consumption

U.S.A. & Canadian models: 3.5 A (420 W)

Other area models: 250 W

Dimensions (W x H x D): 435 x 150 x 322 mm  
17-1/8" x 5-7/8" x 12-11/16"

Weight: 9.6 kg, 21.2 lbs.

## REMOTE CONTROL

Transmitter: Infrared

Signal range: Approx. 5 meters, 16 ft.

Power supply: Two "AA" batteries (1.5 V x 2)

Dimensions (W x H x D): 65 x 18 x 194 mm


2-9/16" x 11/16" x 7-5/8"


Weight: 110 grams, 3.9 oz. (including batteries)

Specifications and features are subject to change without notice.

# SERVICE PROCEDURES

## 1. Replacing the fuses

 This symbol located near the fuse indicates that the fuse used is fast operating type. For continued protection against fire hazard, replace with same type fuse. For fuse rating refer to the marking adjacent to the symbol.

 Ce symbole indique que le fusible utilise est a rapide. Pour une protection permanente, n'utiliser que des fusibles de meme type. Ce dernier est indique la qu le present symbol est appose.

| CIRCUIT NO. | PART NO. | DESCRIPTION                 |
|-------------|----------|-----------------------------|
| F901        | 252164Y  | 5A-UL/T-237,Primary <D/W>   |
| F902        | 252076   | 3.15A-SE-EAK ,Primary <P/W> |
| F903        | 252075   | 2.5A-SE-EAK,Primary <P>     |
| F921,F922   | 252163Y  | 4A-UL/T-237,Secondary<D>    |
|             | 252077   | 4A-SE-EAK,Secondary<P/W>    |

NOTE : <D> : 120V model only  
<P> : 230V model only  
<W> : Worldwide model

## 2. To Initialize the unit

This device employs a microprocessor to perform various functions and operations. If interference generated by an external power supply, radio wave, or other electrical source results in accident which causes the specified operations and functions to operate abnormally.

To perform a result, please follow the procedure below.

1. Turn the power button "ON"
2. Press and hold down the Video 1 button, then press the SPEAKER A button.
3. After "clear" is displayed, the preset memory and each mode stored in the memory, such as surround, are initialized and will return to the factory settings.

## 3. Safety-check out

(Only U.S.A. model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer. Connect the insulating-resistance tester between the plug of power supply cord and the screw on the back panel.

Specifications: 3.3 Mohm $\pm$ 10% at 500V.

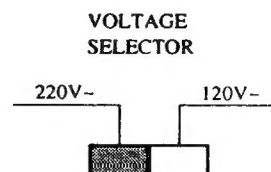
## 4. Change of voltage

Worldwide models are equipment with a voltage selector to conform with local power supplies. This switch is located on the back panel.

Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by

sliding the groove in the switch with the screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.



## 5. Memory preservation

This unit does not require memory preservation batteries.

A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged.

The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory, the power switch must be turned on and off a few times each month the keep the back-up system operative.

The period of the time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorted when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

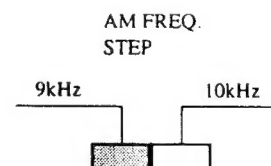
## 6. Setting the tuning step frequency

Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 9 kHz at the factory, but may have to be reset to 10 kHz depending on the area where the unit is used.

AM band step

Europe: 9 kHz

U.S.A.: 10 kHz



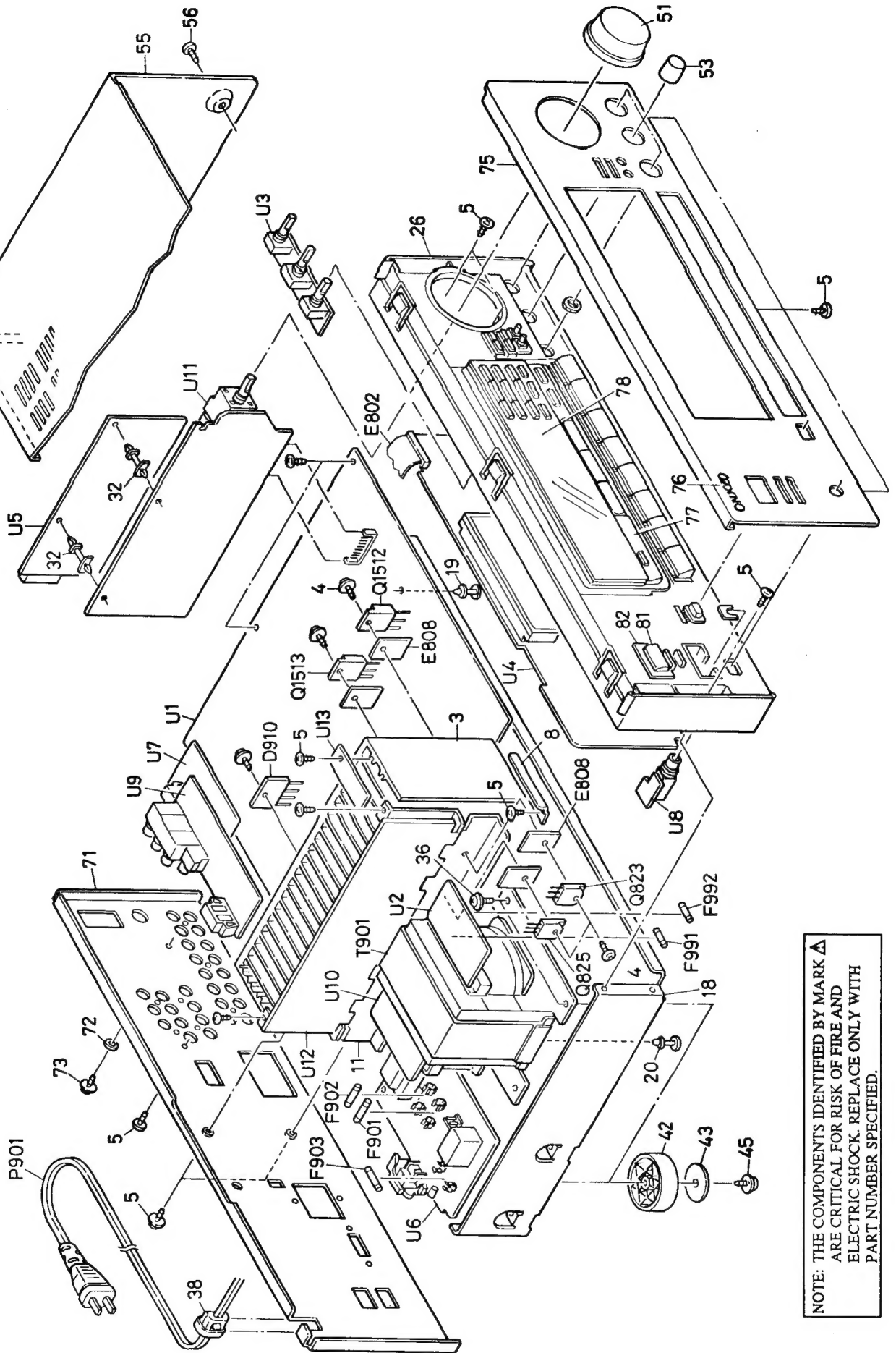
## 7. Changing the band step


With the exception of the worldwide models, a tuning step selector switch is not provided. When you change the band step, change the parts as shown below.

|      | To 10kHz | To 9kHz |
|------|----------|---------|
| R727 | Open     | Short   |
| R724 | 3.3kohm  | Remove  |

# EXPLODED VIEW

Model TX-SV444



NOTE: THE COMPONENTS IDENTIFIED BY MARK  ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

# PARTS LIST

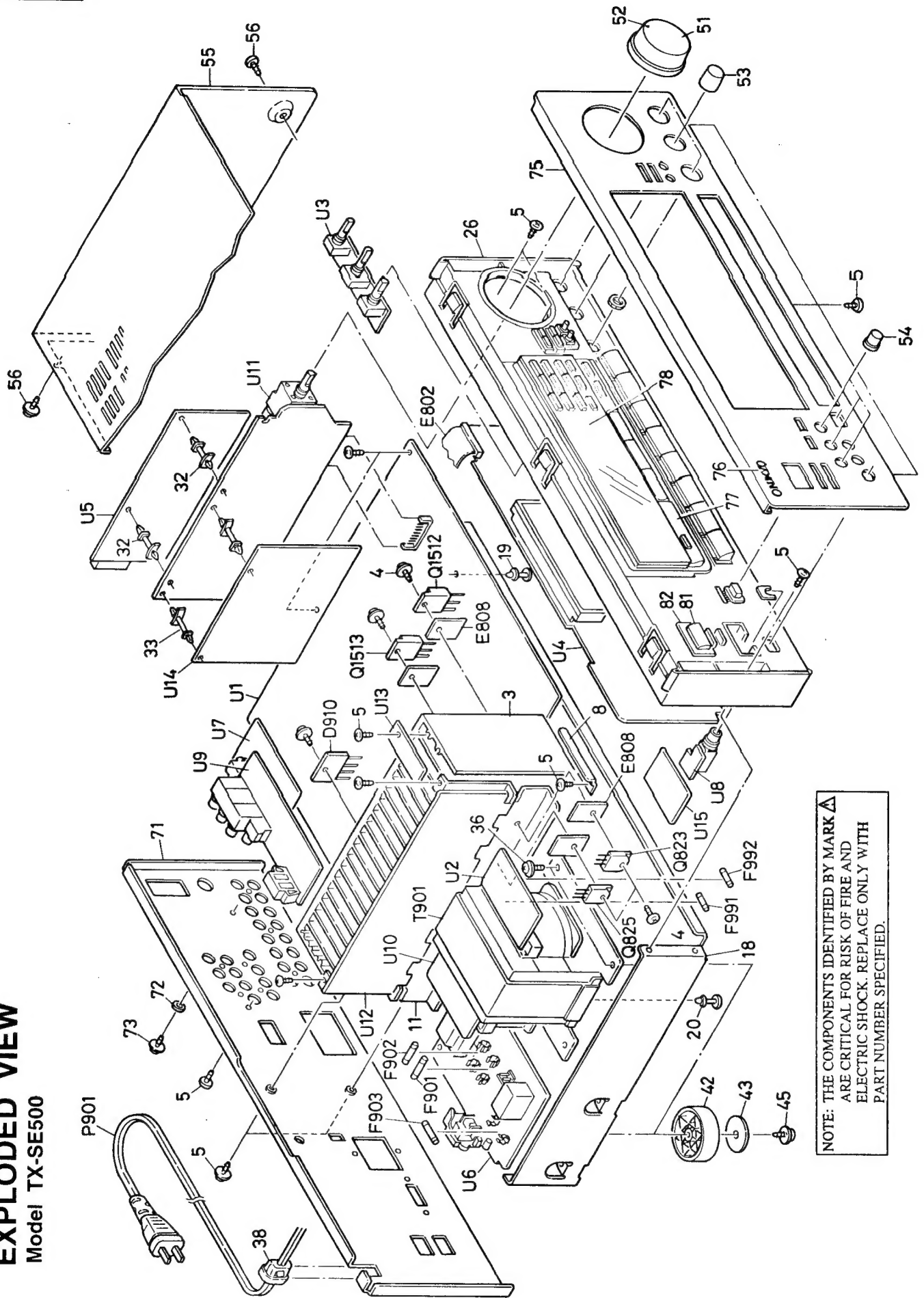
| REF. NO.  | PART NO.    | DESCRIPTION                       |
|-----------|-------------|-----------------------------------|
| 3         | 27160375Y   | Heatsink                          |
| 4         | 801433      | 3MS58W, SW+14B(BC), Special screw |
| 5         | 838130088   | 3TTTB+8B, Self-tapping screw      |
| 8         | 27141671    | Retainer                          |
| 11        | 27160376    | Heatsink S                        |
| 18        | 27100320AY  | Chassis                           |
| 19        | 27190503A   | KGLS-8RF, Holder                  |
| 20        | 27190266    | KGLS-12RF, Holder                 |
| 24        | 28175225Y   | Isolation plate                   |
| 26        | 27110952Y   | Front bracket                     |
| 32        | 27190896    | KGLS-10S, Holder                  |
| 36        | 830440089   | 4TTTC+8C(BC), Self-tapping screw  |
| 38        | 27300750    | #2271, Bushing cord               |
| 42        | 27175319Y   | Leg                               |
| 43        | 28141332Y   | Cushion for leg                   |
| 45        | 831430088   | 3TTTW+8B(BC), Self-tapping screw  |
| 51        | 28325456Y   | Knob, Volume                      |
| 53        | 28325454Y   | Knob, Tone                        |
| 55        | 28184663Y   | Top cover                         |
| 56        | 838430088   | 3TTTB+8B(BC), Self-tapping screw  |
| 71        | 27122260Y   | Rear panel <D>                    |
|           | 27122261Y   | Rear panel <P>                    |
|           | 27122262Y   | Rear panel <W>                    |
|           | 27122263Y   | Rear panel <A>                    |
|           | 27122264Y   | Rear panel <T>                    |
|           | 27122269Y   | Rear panel <K>                    |
| 72        | 87643010    | W3x10F(BC), Washer                |
| 73        | 838230088   | 3TTTB+8B(NI), Nickel screw        |
| 75        | 27211859Y   | Front panel <D>                   |
| 76        | 28135244Y   | Badge                             |
| 77        | 27215273Y   | Decorative frame                  |
| 78        | 28191752AY  | Clear plate                       |
| 81        | 28325451Y   | Knob, power <P/A/K/T/W>           |
| 82        | 27267955Y   | Guide, power <P/A/K/T/W>          |
| D910      | 22380038    | RBV602                            |
| E801      | 260208      | Binder                            |
| E802      | 2047352012Y | NCFC7-352012, Flexible flat cable |
| E808      | 223024      | AC238, Isolation sheet            |
| F901      | 252164Y     | 5A-UL/T-237, Fuse <D/W>           |
| F902      | 252076      | 3.15A-SE-EAK, Fuse <P/A/T/K/W>    |
| F903      | 252075      | 2.5A-SE-EAK, Fuse <P/T>           |
| F991,F992 | 252077      | 4A-SE-EAK, Fuse <P/A/T/K/W>       |
|           | 252163Y     | 4A-UL/T-237, Fuse <D>             |
| P901      | 253192HIT   | AS-UC-6#18, Power supply cord <D> |
|           | 253193HIT   | AS-CEE, Power supply cord <P/T>   |
|           | 253197HIT   | AS-SAA, Power supply cord <A>     |
|           | 253213WSE   | AS-KS, Power supply cord <K>      |
|           | 253233KAW   | AS-CEE-2, Power supply cord <W>   |
| P904,P905 | 25051266    | NSCT-2P1056, AC outlet <K>        |
|           | 25051570    | NSCT-2P1357, AC outlet <A>        |
| Q523,Q524 | 2202843 or  | 2SC5242-O or                      |
| Q1512     | 2202842     | 2SC5242-R, Transistor             |
| Q525,Q526 | 2202833 or  | 2SA1962-O or                      |
| Q1513     | 2202832     | 2SA1962-R, Transistor             |
| Q823,Q824 | 2202923 or  | 2SC5196-O or                      |
|           | 2202922     | 2SC5196-R, Transistor             |
| Q825,Q826 | 2202913 or  | 2SA1939-O or                      |
|           | 2202912     | 2SA1939-R, Transistor             |

NOTE: <D>:1.20V model only  
 <P>:230V model only  
 <W>:Taiwanese model only  
 <A>:Australian model only  
 <T>:Asian model only  
 <K>:Korean model only

| REF. NO. | PART NO.     | DESCRIPTION  |
|----------|--------------|--|
| T901     | 2301228Y     | NPT-1287D, Power transformer <D>                               |
|          | 2301229Y     | NPT-1287P, Power transformer <P/A/T>                           |
|          | 2301271Y     | NPT-1301DG, Power transformer <K/W>                            |
| U1       | 1A720584-1AY | NAAR-5884-1A, Main circuit pc board ass'y <D>                  |
|          | 1A720584-1BY | NAAR-5884-1B, Main circuit pc board ass'y <K/W/P/A/T>          |
| U2       | 1A720585-1BY | NAETC-5885-1B, Secondary circuit pc board ass'y <P/W/T/A/K>    |
|          | 1A720585-1AY | NAETC-5885-1A, Secondary circuit pc board ass'y <D>            |
| U3       | 1A720586-1BY | NAETC-5886-1B, Tone control circuit pc board ass'y <D>         |
|          | 1A720586-1AY | NAETC-5886-1A, Tone control circuit pc board ass'y <P/W/T/A/K> |
| U4       | 1A720587-1AY | NA DIS-5887-1A, Display circuit pc board ass'y <D>             |
|          | 1A720587-1BY | NA DIS-5887-1B, Display circuit pc board ass'y <D>             |
|          | 1A720587-1CY | NA DIS-5887-1C, Display circuit pc board ass'y <T>             |
|          | 1A720587-1DY | NA DIS-5887-1D, Display circuit pc board ass'y <W>             |
|          | 1A720587-1EY | NA DIS-5887-1E, Display circuit pc board ass'y <K>             |
|          | 1A720587-1FY | NA DIS-5887-1F, Display circuit pc board ass'y <A>             |
| U5       | 1A720588-1AY | NA RF-5888-1A, Tuner circuit pc board ass'y <D>                |
|          | 1A720588-1BY | NA RF-5888-1B, Tuner circuit pc board ass'y <D>                |
|          | 1A720588-1CY | NA RF-5888-1C, Tuner circuit pc board ass'y <T>                |
|          | 1A720588-1DY | NA RF-5888-1D, Tuner circuit pc board ass'y <W>                |
|          | 1A720588-1EY | NA RF-5888-1E, Tuner circuit pc board ass'y <K>                |
|          | 1A720588-1FY | NA RF-5888-1F, Tuner circuit pc board ass'y <A>                |
| U6       | 1A720589-1AY | NAPS-5889-1A, Power supply circuit pc board ass'y <D>          |
|          | 1A720589-1BY | NAPS-5889-1B, Power supply circuit pc board ass'y <D>          |
|          | 1A720589-1CY | NAPS-5889-1C, Power supply circuit pc board ass'y <T>          |
|          | 1A720589-1DY | NAPS-5889-1D, Power supply circuit pc board ass'y <W>          |
|          | 1A720589-1EY | NAPS-5889-1E, Power supply circuit pc board ass'y <K>          |
|          | 1A720589-1FY | NAPS-5889-1F, Power supply circuit pc board ass'y <A>          |
| U7       | 1A720590-1AY | NAETC-5890-1A, Video terminal pc board ass'y <D>               |
|          | 1A720590-1BY | NAETC-5890-1B, Video terminal pc board ass'y <D>               |
|          | 1A720590-1CY | NAETC-5890-1C, Video terminal pc board ass'y <T>               |
|          | 1A720590-1DY | NAETC-5890-1D, Video terminal pc board ass'y <W>               |
|          | 1A720590-1EY | NAETC-5890-1E, Video terminal pc board ass'y <K>               |
|          | 1A720590-1FY | NAETC-5890-1F, Video terminal pc board ass'y <A>               |
| U8       | 1A720591-1AY | NAETC-5891-1A, Headphone terminal pc board ass'y <D>           |
|          | 1A720591-1BY | NAETC-5891-1B, Headphone terminal pc board ass'y <D>           |
|          | 1A720591-1CY | NAETC-5891-1C, Headphone terminal pc board ass'y <T>           |
|          | 1A720591-1DY | NAETC-5891-1D, Headphone terminal pc board ass'y <W>           |
|          | 1A720591-1EY | NAETC-5891-1E, Headphone terminal pc board ass'y <K>           |
|          | 1A720591-1FY | NAETC-5891-1F, Headphone terminal pc board ass'y <A>           |
| U9       | 1A720592-1AY | NAETC-5892-1A, Video terminal pc board ass'y <D>               |
|          | 1A720592-1BY | NAETC-5892-1B, Video terminal pc board ass'y <D>               |
|          | 1A720592-1CY | NAETC-5892-1C, Video terminal pc board ass'y <T>               |
|          | 1A720592-1DY | NAETC-5892-1D, Video terminal pc board ass'y <W>               |
|          | 1A720592-1EY | NAETC-5892-1E, Video terminal pc board ass'y <K>               |
|          | 1A720592-1FY | NAETC-5892-1F, Video terminal pc board ass'y <A>               |
| U10      | 1A720593-1AY | NAETC-5893-1A, Primary terminal pc board ass'y                 |
|          | 1A720593-1BY | NAETC-5893-1B, Primary terminal pc board ass'y                 |
|          | 1A720593-1CY | NAETC-5893-1C, Primary terminal pc board ass'y                 |
|          | 1A720593-1DY | NAETC-5893-1D, Primary terminal pc board ass'y                 |
|          | 1A720593-1EY | NAETC-5893-1E, Primary terminal pc board ass'y                 |
|          | 1A720593-1FY | NAETC-5893-1F, Primary terminal pc board ass'y                 |
| U11      | 1A720594-1AY | NAAF-5894-1A, Volume circuit pc board ass'y <D>                |
|          | 1A720594-1BY | NAAF-5894-1B, Volume circuit pc board ass'y <P/T/A/K>          |
|          | 1A720594-1CY | NAAF-5894-1C, Volume circuit pc board ass'y <W>                |
| U12      | 1A720595-1AY | NAAF-5895-1A, Rear amplifier pc board ass'y <D>                |
|          | 1A720595-1BY | NAAF-5895-1B, Rear amplifier pc board ass'y <P/T/A/K>          |
| U13      | 1A720595-1CY | NAAF-5895-1C, Rear amplifier pc board ass'y <W>                |
|          | 25135984     | NCETC-5984, Holder for lead wire                               |

# EXPLODED VIEW

Model TX-SE500



NOTE: THE COMPONENTS IDENTIFIED BY MARK  ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

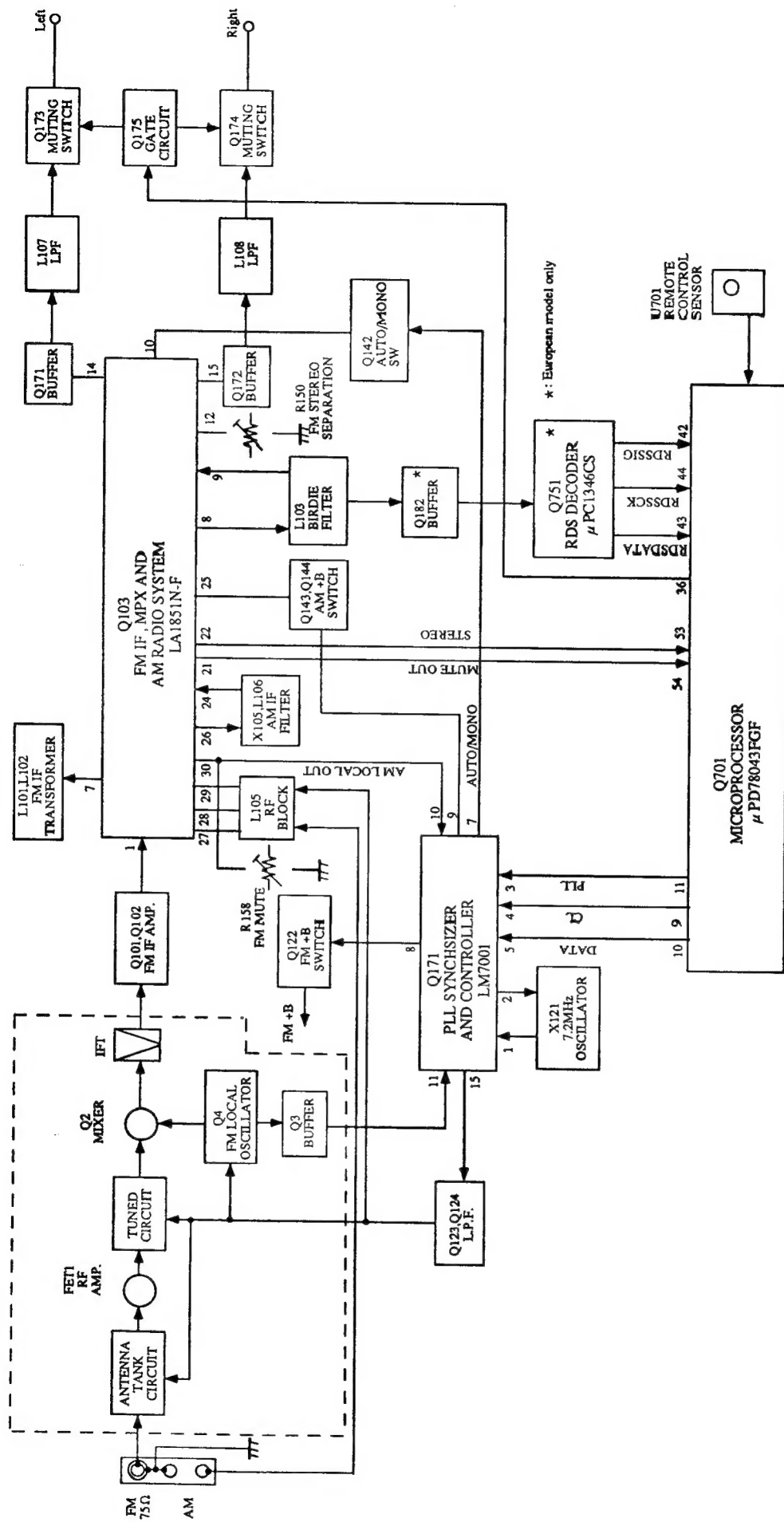


# PARTS LIST

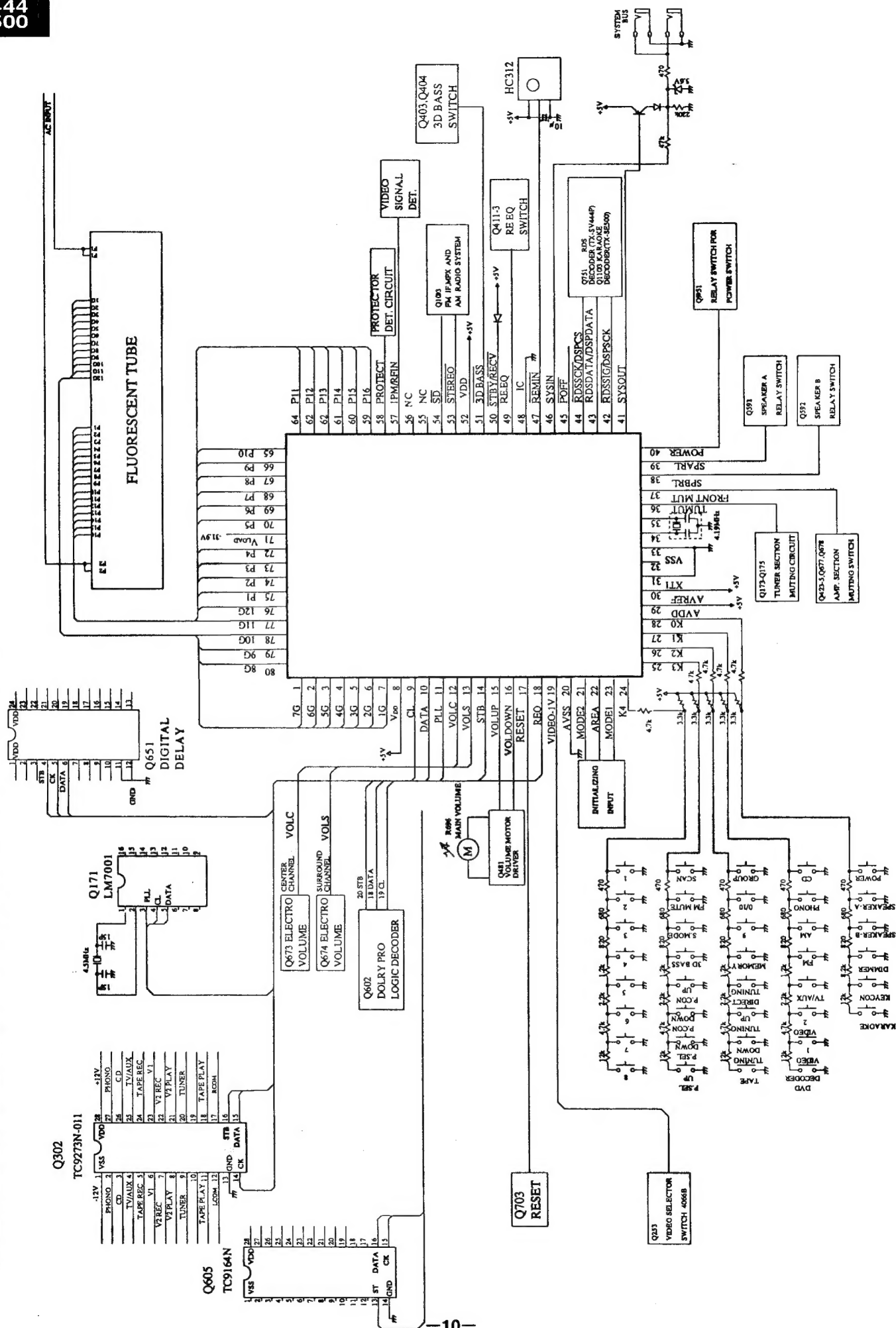
| REF. NO. | PART NO.    | DESCRIPTION                         | REF. NO.  | PART NO.     | DESCRIPTION   |
|----------|-------------|-------------------------------------|-----------|--------------|---|
| 3        | 27160375Y   | Heatsink                            | F901      | 252164Y      | 5A UL/T-237, Fuse <W>                                 |
| 4        | 801433      | 3SMS8W.SW+14B(BC), Special screw    | F902      | 252076       | 3.15A-SE-EAK, Fuse                                    |
| 5        | 838130088   | 3TTB+8B, Self-tapping screw         | F903      | 252075       | 2.5A-SE-EAK, Fuse <P>                                 |
| 8        | 27141671    | Retainer                            | F991,F992 | 252077       | 4A-SE-EAK, Fuse                                       |
| 11       | 27160376    | Heatsink S                          | P901      | 253193HIT    | AS-CEE, Power supply cord <P>                         |
| 18       | 27100320AY  | Chassis                             | P901      | 253213WSE    | AS-KS, Power supply cord <K>                          |
| 19       | 27190503A   | KGLS-8RF, Holder                    | P904,P905 | 253233KAW    | AS-CEE-2, Power supply cord <W>                       |
| 20       | 27190266    | KGLS-12RF, Holder                   | Q523,Q524 | 25051266     | NSCT-2P1056, AC outlet <K>                            |
| 24       | 28175225Y   | Isolation plate                     | Q1512     | 2202843 or   | 2SC5242-O or  |
| 26       | 27110952Y   | Front bracket <B>                   | Q1512     | 2202842      | 2SC5242-R, Transistor                                 |
| 32       | 27110992Y   | Front bracket <G>                   | Q525,Q526 | 2202833 or   | 2SA1962-O or  |
| 33       | 27190896    | KGLS-10S, Holder                    | Q1513     | 2202832      | 2SA1962-R, Transistor                                 |
| 36       | 830440089   | KGLS-18S, Holder                    | Q823,Q824 | 2202923 or   | 2SC5196-O or  |
| 38       | 27300750    | 4TTC+8C(BC), Self-tapping screw     | Q825,Q826 | 2202922      | 2SC5196-R, Transistor                                 |
| 42       | 27175319Y   | #2271, Bushing cord                 | T901      | 2202913 or   | 2SA1939-O or  |
| 43       | 28141332Y   | Leg                                 |           | 2202912      | 2SA1939-R, Transistor                                 |
| 45       | 831430088   | Cushion for leg                     | U1        | 2301229Y     | NPT-1287P, Power transformer <P>                      |
| 51       | 28325456Y   | 3TTW+8B(BC), Self-tapping screw     | U2        | 2301271Y     | NPT-1301DG, Power transformer <K/W>                   |
| 53       | 28325493Y   | Knob, Volume <G>                    | U3        | 1A721584-2Y  | NAAR-5884-2, Main circuit pc board ass'y              |
| 54       | 28325454Y   | Knob, Volume <B>                    | U4        | 1A721585-2Y  | NAETC-5885-2, Secondary circuit pc board ass'y        |
| 55       | 28325494Y   | Knob, Tone <B>                      |           | 1A721586-2Y  | NAETC-5886-2, Tone control circuit pc board ass'y     |
| 56       | 28325452Y   | Knob, Tone <G>                      |           | 1A721587-2AY | NADIS-5887-2A, Display circuit pc board ass'y <P>     |
| 71       | 28325495Y   | Knob, Mic. <B>                      |           | 1A721587-2BY | NADIS-5887-2B, Display circuit pc board ass'y <W>     |
| 72       | 28184663Y   | Knob, Mic. <G>                      |           | 1A721587-2CY | NADIS-5887-2C, Display circuit pc board ass'y <K>     |
| 73       | 28184682Y   | Knob, Mic. <B>                      |           | 1A721588-2AY | NARF-5888-2A, Tuner circuit pc board ass'y <P>        |
| 75       | 838430088   | Top cover <B>                       |           | 1A721588-2BY | NARF-5888-2B, Tuner circuit pc board ass'y <W>        |
| 76       | 27122265Y   | Top cover <G>                       |           | 1A721588-2CY | NARF-5888-2C, Tuner circuit pc board ass'y <K>        |
| 77       | 27122267Y   | 3TTB+8B(BC), Self-tapping screw <B> |           | 1A721589-2AY | NAPS-5889-2A, Power supply circuit pc board ass'y <P> |
| 78       | 87643010    | 3TTB+8B(NI), Self-tapping screw <G> |           | 1A721589-2BY | NAPS-5889-2B, Power supply circuit pc board ass'y <W> |
| 81       | 27211862Y   | Rear panel <P>                      |           | 1A721589-2CY | NAPS-5889-2C, Power supply circuit pc board ass'y <K> |
| 82       | 27212268Y   | Rear panel <W>                      |           | 1A721590-2AY | NAETC-5890-2A, Video terminal pc board ass'y <P>      |
| D910     | 27212268Y   | Rear panel <K>                      |           | 1A721590-2BY | NAETC-5890-2B, Video terminal pc board ass'y <W>      |
| E801     | 87643010    | W3x10F(BC), Washer                  |           | 1A721590-2CY | NAETC-5890-2C, Video terminal pc board ass'y <K>      |
| E802     | 27211862Y   | Front panel <B>                     |           | 1A721591-2AY | NAETC-5891-2A, Hadphone terminal pc board ass'y <P>   |
| E808     | 27211907Y   | Front panel <G>                     |           | 1A721591-2BY | NAETC-5891-2B, Hadphone terminal pc board ass'y <W>   |
| E815     | 28135244Y   | Badge <B>                           |           | 1A721592-2AY | NAETC-5892-2A, Video terminal pc board ass'y <P>      |
|          | 28135245Y   | Badge <G>                           |           | 1A721592-2BY | NAETC-5892-2B, Video terminal pc board ass'y <W>      |
|          | 27215273Y   | Decorative frame <B>                |           | 1A721592-2CY | NAETC-5892-2C, Video terminal pc board ass'y <K>      |
|          | 28191752AY  | Decorative frame <G>                |           | 1A721593-2AY | NAETC-5893-2A, Primary terminal pc board ass'y <P>    |
|          | 28191778Y   | Clear plate <B>                     |           | 1A721593-2BY | NAETC-5893-2B, Primary terminal pc board ass'y <W>    |
|          | 28325451Y   | Clear plate <G>                     |           | 1A721593-2CY | NAETC-5893-2C, Primary terminal pc board ass'y <K>    |
|          | 28325496Y   | Knob, power <B>                     |           | 1A721594-2Y  | NAAF-5894-2, Volume circuit pc board ass'y <P/K>      |
|          | 27267955Y   | Knob, power <G>                     |           | 1A721594-2AY | NAAF-5894-2A, Volume circuit pc board ass'y <W>       |
|          | 27267959Y   | Guide, power <B>                    |           | 1A721595-2Y  | NAAF-5895-2, Rear amplifier pc board ass'y <P/K>      |
|          | 22380038    | Guide, power <G>                    |           | 1A721595-2AY | NAAF-5895-2A, Rear amplifier pc board ass'y <W>       |
|          | 260208      | RBV602                              |           | 25135984     | NCETC-5984, Holder for lead wire                      |
|          | 2047352012Y | Binder                              |           | 1A721596-1Y  | NADG-5896-1, Digital circuit pc board ass'y           |
|          | 223024      | NCFC7-352012, Flexible flat cable   |           | 1A721597-1Y  | NAETC-5897-1, Mic. terminal pc board ass'y            |
|          | 260208Y     | AC238, Isolation sheet              |           |              |   |
|          |             | Wire tie                            |           |              |   |

**NOTES:**  
 <B>: Black model only  
 <G>: Golden model only  
 <P>: Asian model only  
 <W>: Taiwanese model only  
 <K>: Korean model only

## OTHER MODELS







# MICROPROCESSOR TERMINAL DESCRIPTION

| Pin No. | Function | Descriptions   |
|---------|----------|--|
| 1-7     | 7G-1G    | Grid output terminals  |
| 8       | VDD      | Positive power supply terminal (+5V)                           |
| 9       | CL       | Clock output terminal.   |
| 10      | DATA     | Data output terminal.  |
| 11      | PLL      | Chip enable output terminal for PLL IC                         |
| 12      | VOLC     | Clock output terminal for electro volume of center channel.    |
| 13      | VOLS     | Clock output terminal for electro volume of surround channels. |
| 14      | STB      | Strobe output terminal   |
| 15      | VOLUP    | Volume control output terminal                                 |
| 16      | VOLDOWN  | Volume control output terminal                                 |
| 17      | RESET    | System reset input terminal                                    |
| 18      | REQ      | Request terminal for Digital delay and Dolby ICs               |
| 19      | VIDEO-1V | Video signal selector terminal                                 |
| 20      | AVSS     | Ground terminal for A/D converter                              |
| 21      | MODE2    | Initializing input terminal                                    |
| 22      | AREA     | Initializing input terminal for region of frequency range      |
| 23      | MODE1    | Initializing input terminal                                    |
| 24      | K4-K0    | Key input terminals  |
| 29      | AVDD     | Analog power supply terminal (+5V)                             |
| 30      | AVREF    | Reference voltage input terminal for A/D converter             |
| 31      | XT1      | Crystal connection terminals for subsystem clock               |
| 32      | XT2      | Not used.  |
| 33      | VSS      | Ground terminal  |
| 34      | X1       | Crystal connection terminals for main system clock             |
| 35      | X2       | Connect the 4.19MHz ceramic oscillator.                        |
| 36      | TUMUT    | Muting output terminal for tuner section                       |
| 37      | FRONTMUT | Muting output terminal for amplifier of front channels.        |
| 38      | SPBRL    | Speaker relay B control output terminal                        |
| 39      | SPARL    | Speaker relay A control output terminal                        |
| 40      | POWER    | Power source control output terminal                           |
| 41      | SYSOUT   | System code output terminal                                    |
| 42      | RDSSIG   | Detection input terminal for RDS broadcast                     |
| 43      | RDSDATA  | Data input terminal for RDS broadcast                          |
| 44      | RDSSCK   | Clock input terminal from RDS demodulator                      |
| 42      | DSPSCK   | Clock output terminal for KARAOKE IC.                          |
| 43      | DSPDATA  | Data output terminal for KARAOKE IC.                           |

| Pin No. | Function  | Descriptions   |
|---------|-----------|--|
| 44      | DSPCS     | Chip select output terminal for KARAOKE IC.                          |
| 45      | POFF      | Power failure detection input terminal                               |
| 46      | SYSIN     | system code input terminal   |
| 47      | REMIN     | Remote control signal input terminal                                 |
| 48      | IC        | Internal connection terminal   |
| 49      | RE-EQ     | RE-EQ control output terminal  |
| 50      | STBY/RECV | STANDBY/RECEIVED indication output terminal                          |
| 51      | 3DB       | 3-D bass control output terminal                                     |
| 52      | VDD       | Power supply terminal (+5V)  |
| 53      | STEREO    | Stereo broadcast detection input terminal                            |
| 54      | SD        | Broadcast detection input terminal                                   |
| 55,56   | NC        | Not used.  |
| 57      | IPM       | Audio IPM operation input terminal                                   |
| 58      | PROTECT   | Detection input terminal for protection circuit                      |
| 59      | P16-P5    | Segment output terminals   |
| 71      | VLOAD     | Pull-down resistor connection terminal for FIP controller and driver |
| 72      | P4-P1     | Segment output terminals   |
| 76-80   | 12G-8G    | Grid output terminals  |

## Volume control output

|      | 15 | 16 |
|------|----|----|
| Stop | H  | H  |
| Up   | H  | L  |
| Down | L  | H  |

## FM band

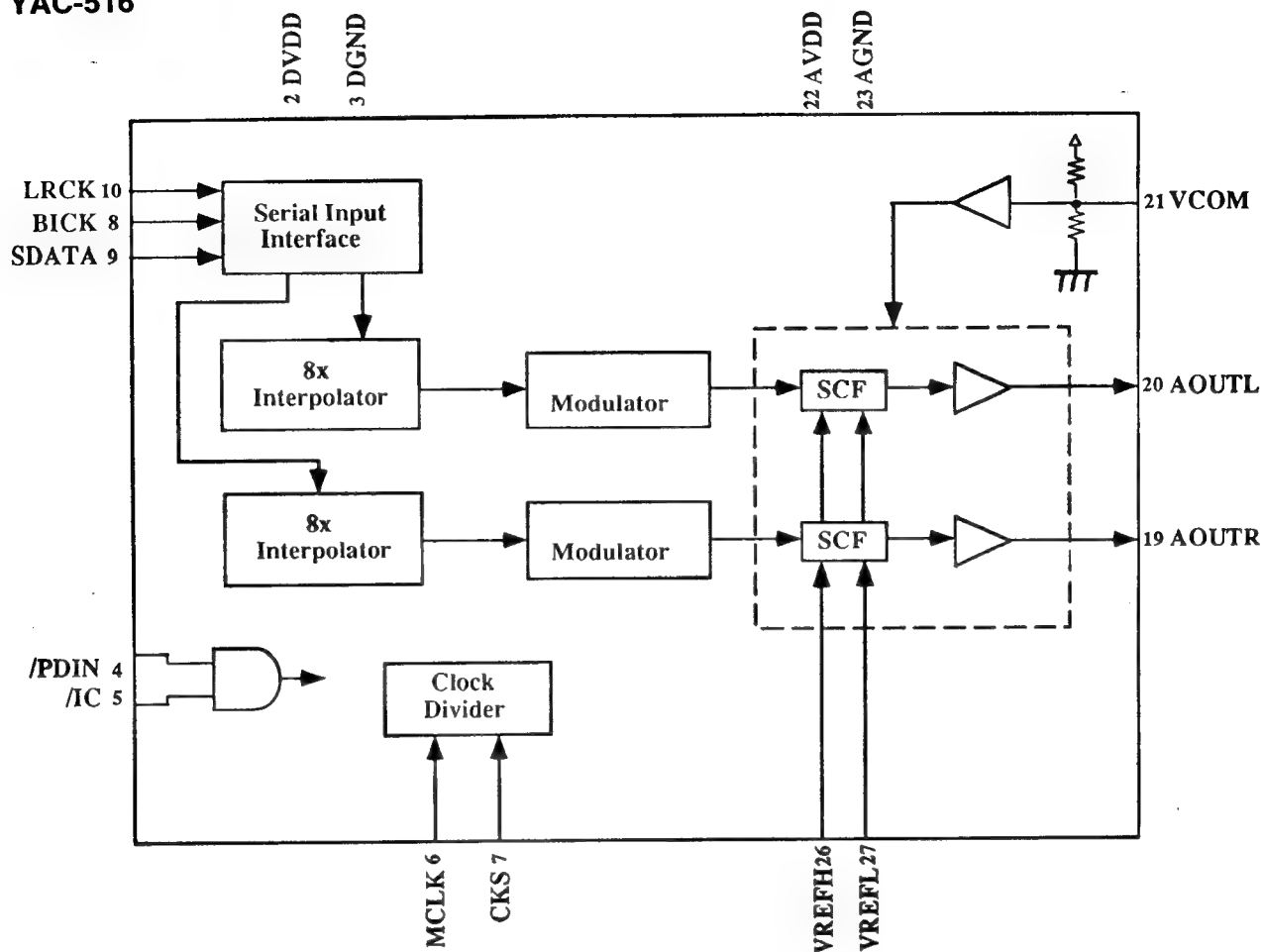
| BAND1 | BAND0 | Region | Frequency Range | Channel space |
|-------|-------|--------|-----------------|---------------|
| 0     | 0     | Europe | 87.50~108.00MHz | 50kHz         |
| 0     | 1     | Saudi  | 87.50~108.00MHz | 50kHz         |
| 1     | 0     | Japan  | 76.0~90.0MHz    | 100kHz        |
| 1     | 1     | U.S.A  | 87.5~108MHz     | 100kHz        |

## AM band

| BAND1 | BAND0 | AM10K | Region | Frequency Range | Channel space |
|-------|-------|-------|--------|-----------------|---------------|
| 0     | 0     | 0     | Europe | 522~1611kHz     | 9 kHz         |
| 0     | 1     | 0     | Saudi  | 531~1602kHz     | 9 kHz         |
| 1     | 0     | 0     | Japan  | 522~1629kHz     | 9 kHz         |
| 1     | 1     | 0     | U.S.A  | 522~1629kHz     | 9 kHz         |
| 1     | 1     | 1     | U.S.A  | 530~1710kHz     | 10 kHz        |

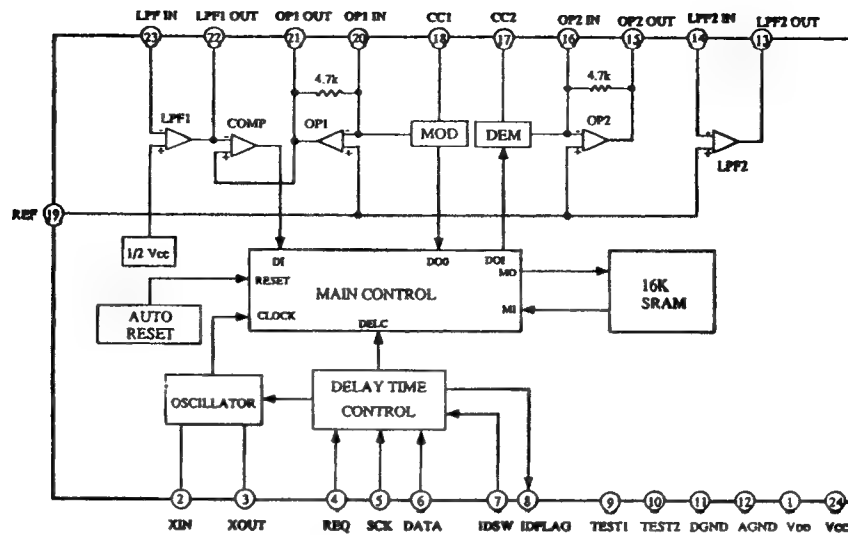
# IC BLOCK DIAGRAM AND DESCRIPTIONS

YAC-516

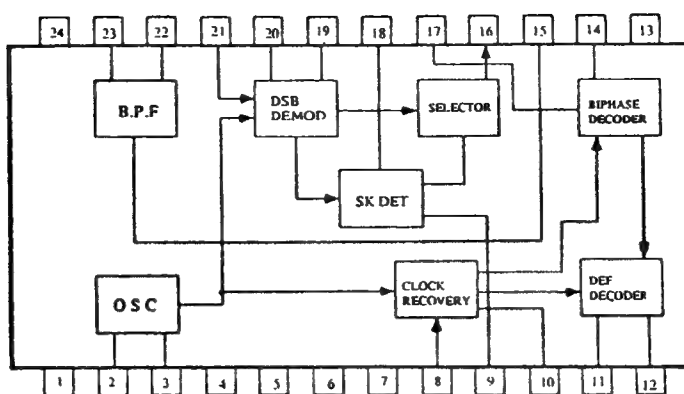


| Pin No. | Terminal | I/O | Function   |
|---------|----------|-----|--|
| 1       | TST 1    | I   | Test terminal                                    |
| 2       | DVDD     | —   | Power supply terminal for digital section        |
| 3       | DGND     | —   | Ground terminal for digital section              |
| 4       | /PDIN    | I   | Power down mode input terminal                   |
| 5       | /IC      | I   | Initializing clear input terminal                |
| 6       | MCLK     | I   | Master clock input terminal                      |
| 7       | CKS      | I   | Clock select terminal                            |
| 8       | BICK     | I   | Serial bit clock input terminal                  |
| 9       | SDATA    | I   | Serial data input pin                            |
| 10      | LRCK     | I   | Serial L/R clock input terminal                  |
| 19      | AOUTR    | OA  | Right channel analog output terminal             |
| 20      | AOUTL    | OA  | Left channel analog output terminal              |
| 21      | VCOM     | OA  | Common voltage terminal                          |
| 22      | AVDD     | —   | Power supply terminal for analog section         |
| 23      | AGND     | —   | Ground terminal for analog section               |
| 26      | VREFH    | IA  | Reference voltage input terminal when high level |
| 27      | VREFL    | IA  | Reference voltage input terminal when low level  |
| 28      | TST 2    | O   | Test terminal                                    |

## NJU9702D (Digital Delay)

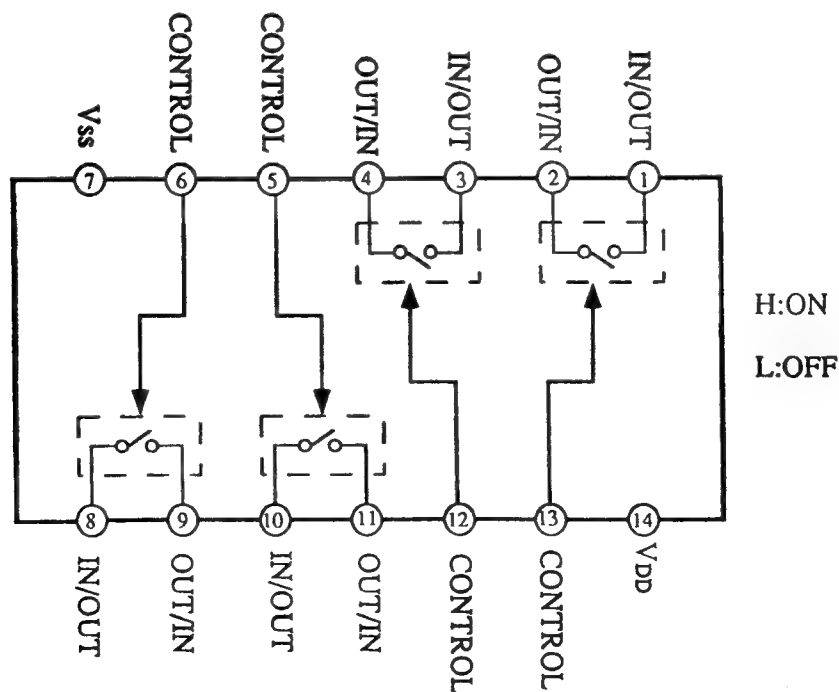


| Pin No. | Mark     | Function                | I/O | Description  |
|---------|----------|-------------------------|-----|--|
| 1       | VDD      | Digital power supply    | -   |  |
| 2       | XIN      | Resonator input         | I   | Connect the 2MHz ceramic resonator                   |
| 3       | XOUT     | Resonator output        | O   |  |
| 4       | REQ      | Request                 | I   | Data request input                                   |
| 5       | SCK      | Shift lock              | I   | Serial data shift clock input                        |
| 6       | DATA     | Data                    | I   | Serial data input                                    |
| 7       | IDSW     | ID switch               | I   | External input of 4th bit of ID code                 |
| 8       | IDFLAG   | ID flag                 | O   | Data input confirmation pulse and serial data output |
| 9       | TEST1    | Test 1                  | -   | Normal mode when low level                           |
| 10      | TEST2    | Test 2                  | -   | Normal mode when low level                           |
| 11      | D GND    | Digital ground          | -   |  |
| 12      | A GND    | Analog ground           | -   |  |
| 13      | LPF2 OUT | LPF filter 2 output     | O   |  |
| 14      | LPF2 IN  | LPF filter 2 input      | I   |  |
| 15      | OP2 OUT  | Operation amp. 2 output | O   |  |
| 16      | OP2 IN   | Operation amp. 2 input  | I   |  |
| 17      | CC2      | Current control 2       | -   | Demodulation ADM control                             |
| 18      | CC1      | Current control 1       | -   | Modulation ADM control                               |
| 19      | REF      | Reference               | -   | Analog reference voltage=1/2VCC                      |
| 20      | OP1 IN   | Operation amp. 1 input  | I   |  |
| 21      | OP1 OUT  | Operation amp. 1 output | O   |  |
| 22      | LPF1 OUT | LPF filter 1 output     | O   |  |
| 23      | LPF1 IN  | LPF filter 1 input      | I   |  |
| 24      | VCC      | Analog power supply     | -   |  |

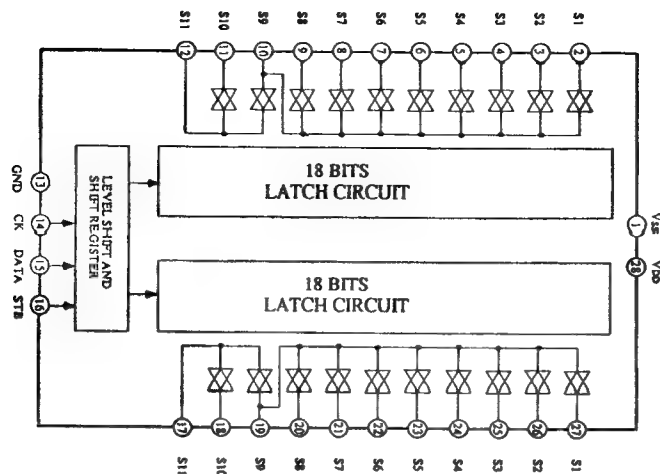
$\mu$ PC1346CS (RDS Decoder)

| No. | Terminal  | Description                                       | No. | Terminal | Description                                    |
|-----|-----------|---|-----|----------|--|
| 1   | Vcc       | Supply voltage for the digital circuit            | 13  | GND      | Ground for the analog circuit                  |
| 2   | OSC IN    | Resonator input                                   | 14  | INTEG    | Integrating filter terminal                    |
| 3   | OSC OUT   | Resonator output                                  | 15  | BPF ADJ  | Adjustment fc of band pass filter              |
| 4   | GND       | Ground for the digital circuit                    | 16  | PSK OUT  | Biphase signal output                          |
| 5   | TEST1     | Test input  | 17  | PSK IN   | Biphase decoder input                          |
| 6   | TEST2     | Test input  | 18  | LPF SK   | Low pass filter for the detection SK           |
| 7   | OP.CTL    | Control input of the operation stop               | 19  | LPF Q    | Low pass filter for the crossed detector       |
| 8   | S/L CTL   | Mode control input of the synchronizing detection | 20  | LPF I    | Low pass filter for the synchronizing detector |
| 9   | SK OUT    | SK detection output                               | 21  | DSB IN   | DSB demodulator circuit input                  |
| 10  | RDS OUT   | RDS synchronizing detection output                | 22  | BPF OUT  | Band pass filter output                        |
| 11  | CLOCK OUT | Bit rate clock output                             | 23  | BPF IN   | Band pass filter input                         |
| 12  | DATA OUT  | RDS data output                                   | 24  | Vcc      | Supply voltage for analog circuit              |

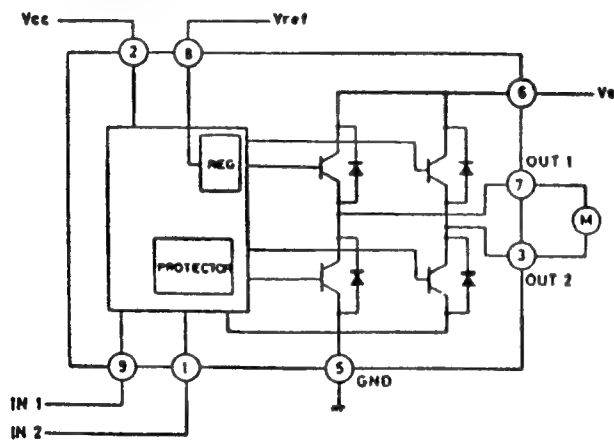
## LC4966 (Analog Switch)



## TC9273N-010 (Analog Switch)



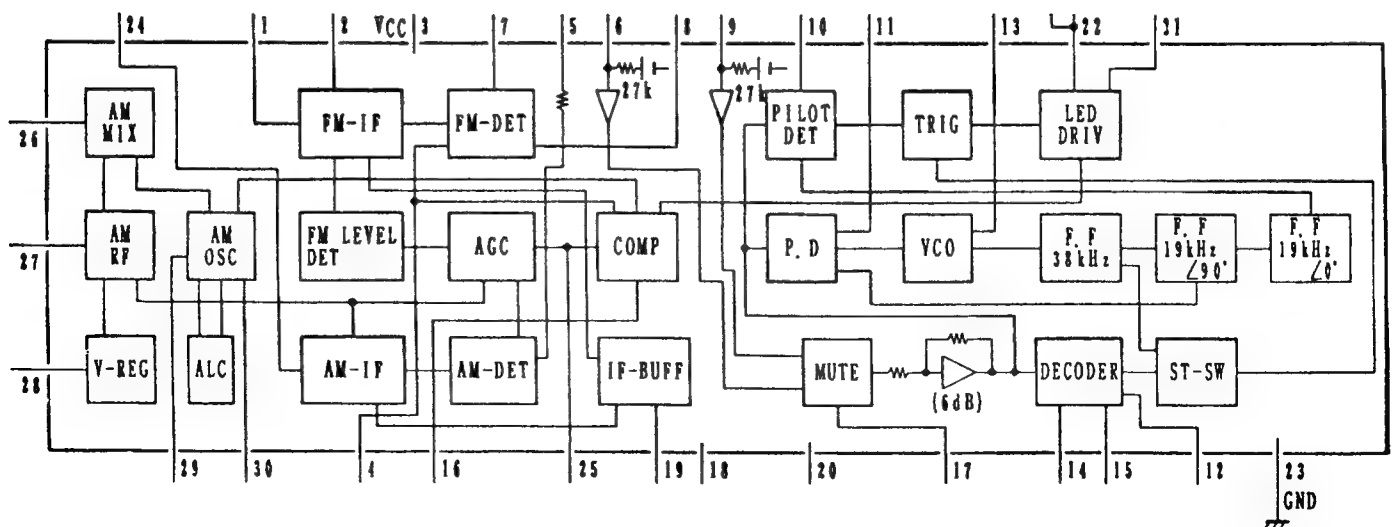
## TA7291S (Volume driver)



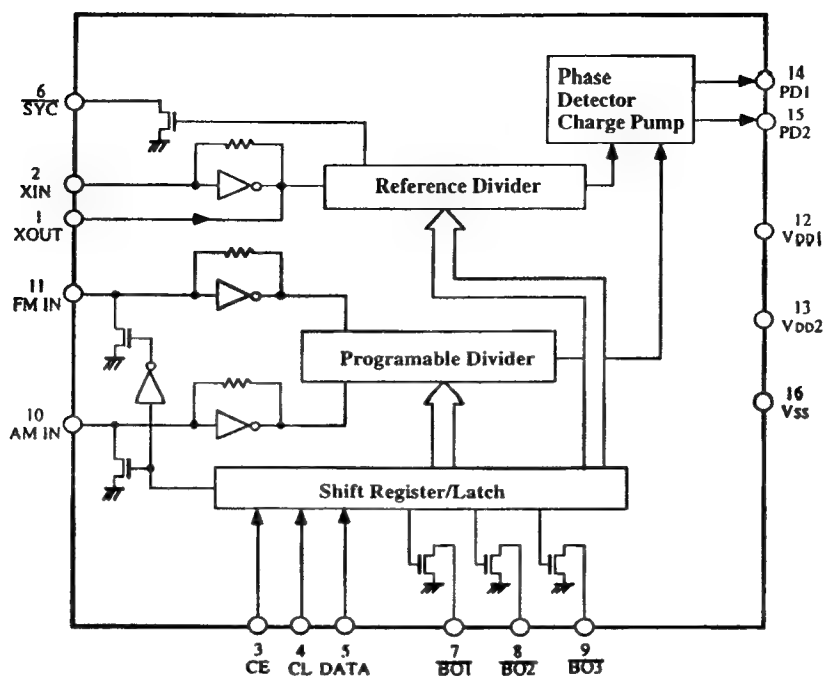
| INPUT |      | OUTPUT   |          | MODE   |
|-------|------|----------|----------|--------|
| IN 1  | IN 2 | OUT 1    | OUT 2    |        |
| 0     | 0    | $\infty$ | $\infty$ | STOP   |
| 1     | 0    | H        | L        | CW/CCW |
| 0     | 1    | L        | H        | CCW/CW |
| 1     | 1    | L        | L        | BRAKE  |

CCW: Counter clockwise direction  
CW: Clockwise direction

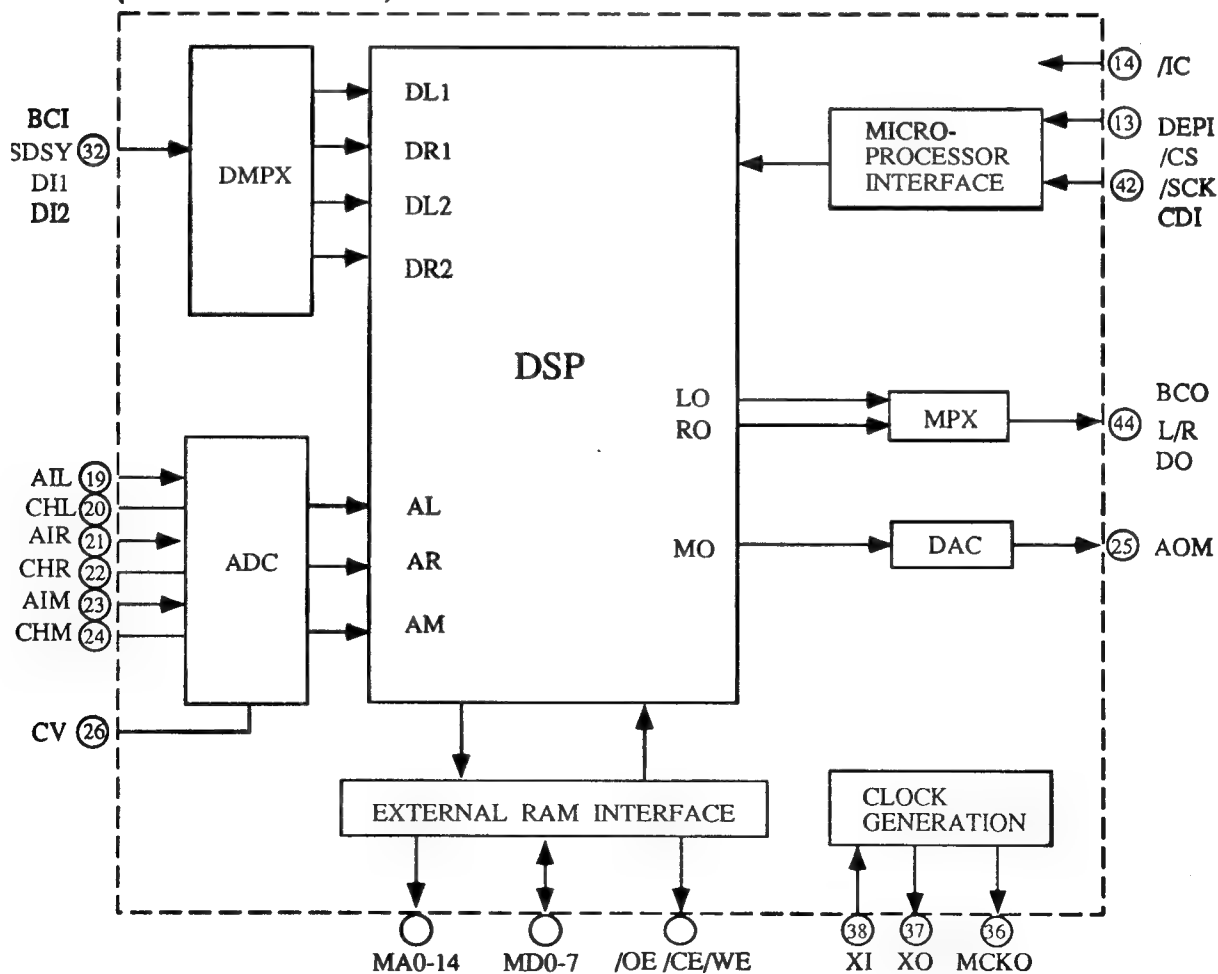
## LA1851N (AM, FM IF and MPX)



## LM7001 (PLL Frequency Synthesized IC)



## YSS240-F (Karaoke Decoder)





## ADJUSTMENT PROCEDURES

### Preparation

#### 1. Input

FM mono: 1kHz, 75kHz devi., 60dB/ $\mu$ V

FM stereo: 1kHz, 67.5kHz devi., 60dB/ $\mu$ V

Pilot signal 19kHz 7.5kHz devi.

AM: 400Hz, 30% mod.

#### 2. Outputs

Connect the non-inductive type resistor of 8 ohms to the all speaker terminals unless otherwise noted.

#### 1.FM ADJUSTMENT

| Item              | Step | Connection of instrument | FM SG output                               | Stereo modulator output    | Tuning frequency | Output indicator    | Adjustment point     | Adjust for          | Remarks   |
|-------------------|------|--------------------------|--|----------------------------|------------------|---------------------|----------------------|---------------------|---|
| FM IF/RF          | 1    | Fig.1                    | 99.0MHz<br>1kHz 75kHz devi.<br>65dBf(60dB) | —                          | 99.0MHz          | DC voltmeter        | L101                 | $0 \pm 20\text{mV}$ | FM MUTE/MODE switch:ON/AUTO<br>Repeat the steps 1 and 3 until no further adjustment is necessary. |
|                   | 2    |                          |  |                            |                  | AC voltmeter        | IFT on the front end | Maximum             |   |
|                   | 3    |                          |  |                            |                  | Distortion analyzer | L102                 | Minimum             |   |
| Stereo Distortion |      | Fig.2                    | 99.0MHz Ext. mod.65dBf(60dB)               | Channel L or R 1kHz        | 99.0MHz          | Distortion analyzer | IFT on the front end | Minimum             | FM MUTE/MODE switch:ON/AUTO<br>Don't turn more than $\pm 180^\circ$                               |
| Stereo Separation |      | Fig.2                    | 99.0MHz Ext. mod.65dBf(60dB)               | Channel L or R 1kHz        | 99.0MHz          | Oscilloscope        | R150                 | Maximum separation  |   |
| Muting Level      |      | Fig.1                    | 99.0MHz<br>19.2dBf(14dB)                   | —                          | 99.0MHz          | Oscilloscope        | R158                 | Signal output       |   |
| RDS               |      | Fig.3                    | 99.0MHz Ext. mod.60dB                      | RDS data or 57kHz 3% devi. | 99.0MHz          | Oscilloscope        | R798                 | Maximum             | European model only   |

#### 2.AM ADJUSTMENT

##### 120V model

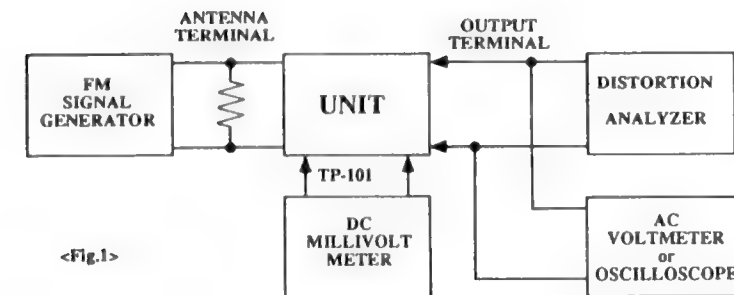
| Step | AM SG output                       | Tuning Frequency | Output Indicator     | Adjustment point          | Adjust for            |
|------|------------------------------------|------------------|----------------------|---------------------------|-----------------------|
| 1    |                                    | 530kHz           | Digital DC voltmeter | OSC coil on RF block L105 | $1.3 \pm 0.2\text{V}$ |
| 2    | 600kHz<br>400Hz 30% mod.<br>60dB/m | 600kHz           | AC voltmeter         | RF coil on RF block L105  | Maximum               |
| 3    | 990kHz<br>400Hz 30% mod.<br>60dB/m | 990kHz           | AC voltmeter         | L106                      | Maximum               |

Reference Specification  
FM tuned voltage:87.50MHz~108.00MHz  
More than 1.2V~Less than 10V  
AM tuned voltage:530kHz~1710kHz  
 $1.3 \pm 0.2$ ~Less than 9.0V

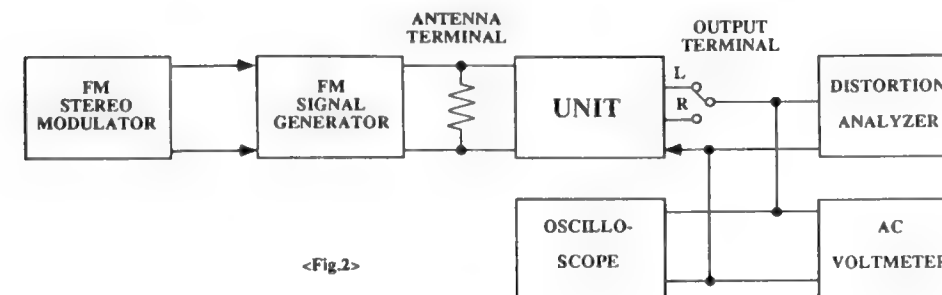
##### 230V and Wolrdwide models

| Step | AM SG output                       | Tuning Frequency | Output Indicator     | Adjustment point          | Adjust for            |
|------|------------------------------------|------------------|----------------------|---------------------------|-----------------------|
| 1    |                                    | 522kHz or 531kHz | Digital DC voltmeter | OSC coil on RF block L105 | $1.3 \pm 0.2\text{V}$ |
| 2    | 603kHz<br>400Hz 30% mod.<br>60dB/m | 603kHz           | AC voltmeter         | RF coil on RF block L105  | Maximum               |
| 3    | 999kHz<br>400Hz 30% mod.<br>60dB/m | 999kHz           | AC voltmeter         | L106                      | Maximum               |

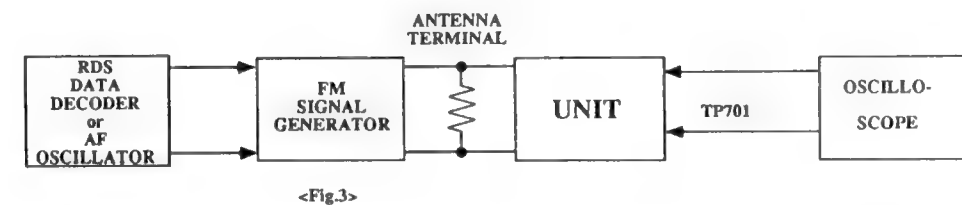
Reference Specification  
FM tuned voltage:87.50MHz~108.00MHz  
More than 1.2V~Less than 10V  
AM tuned voltage:522kHz~1611kHz  
 $1.3 \pm 0.2$ ~Less than 9.0V (230V model)  
AM tuned voltage:531kHz~1602kHz  
 $1.3 \pm 0.2$ ~Less than 9.0V (Worldwide model)



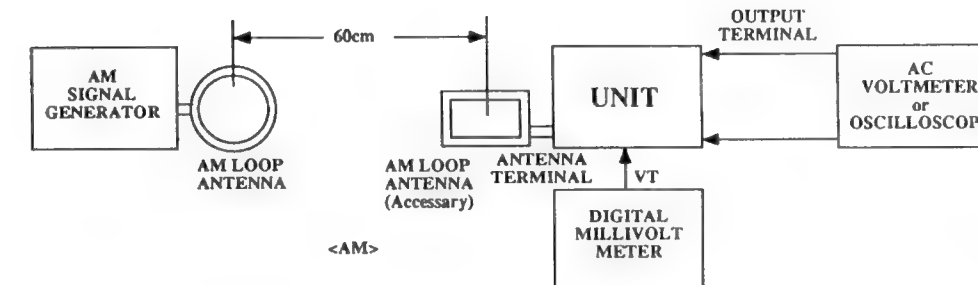
<Fig.1>



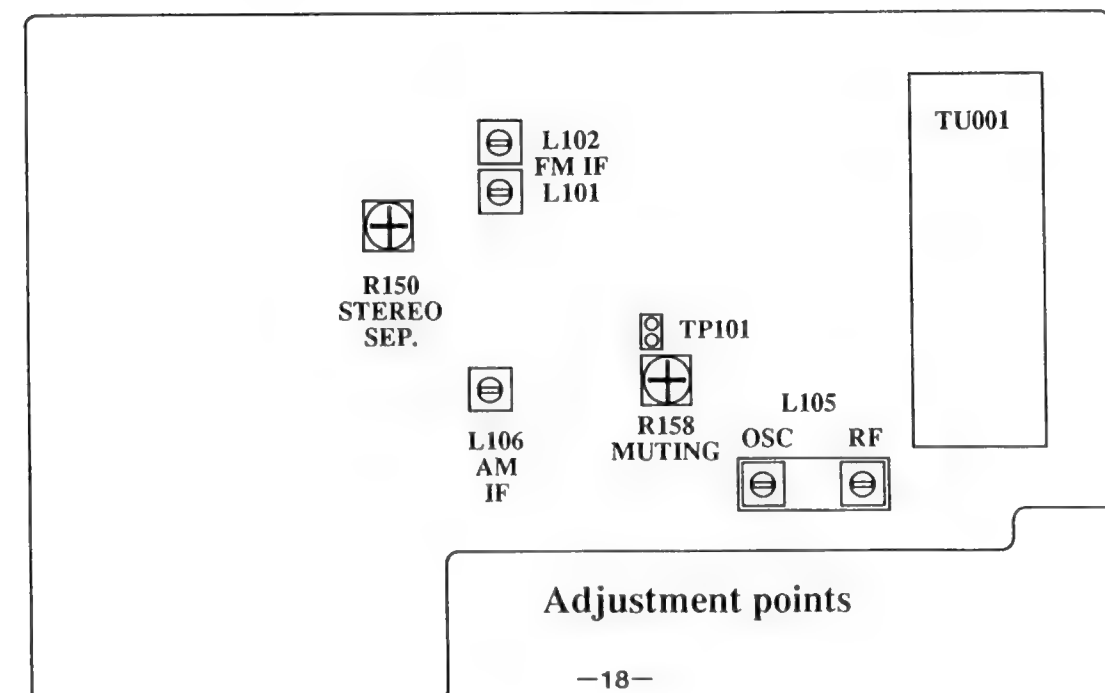
<Fig.2>



<Fig.3>



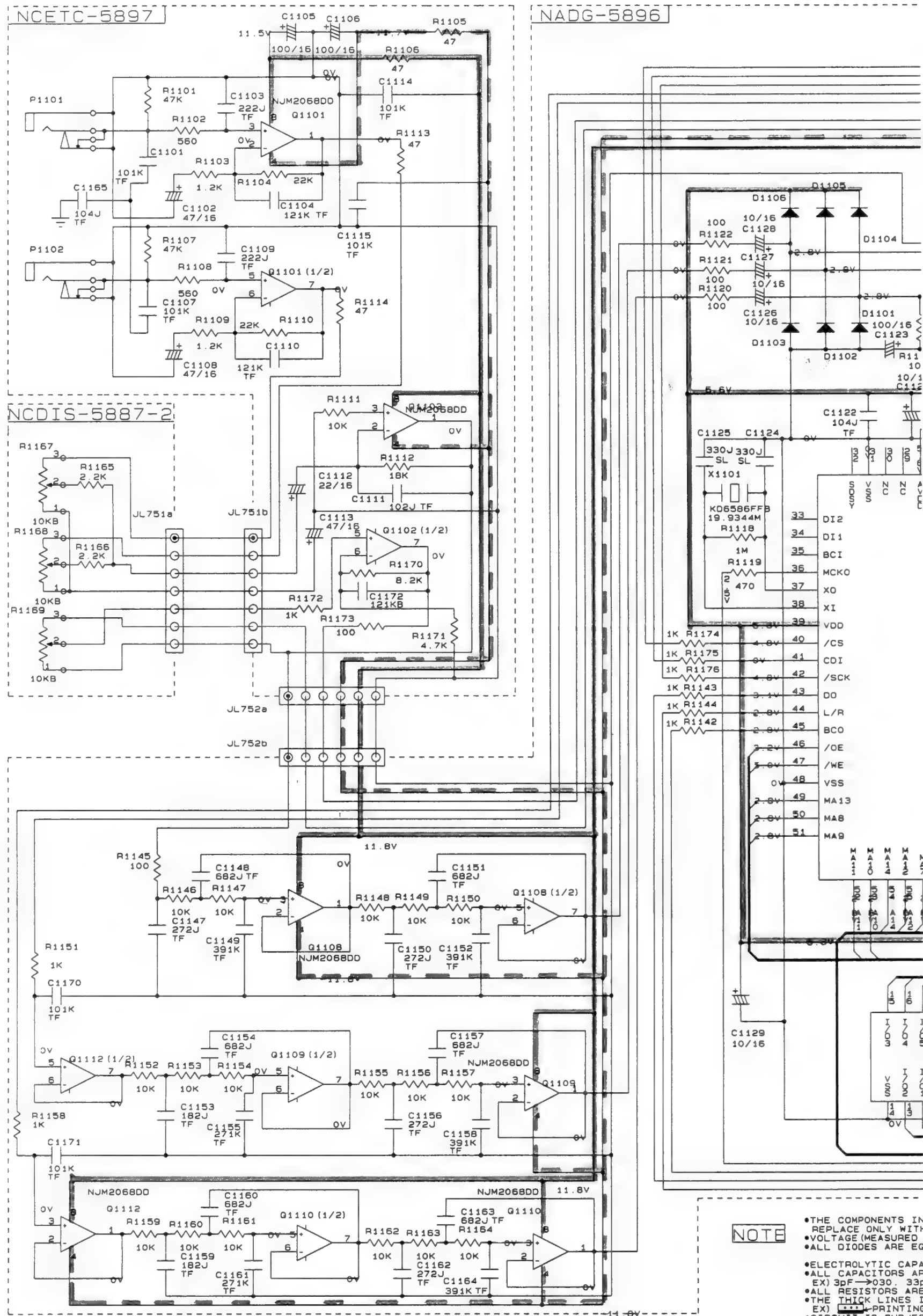
<AM>

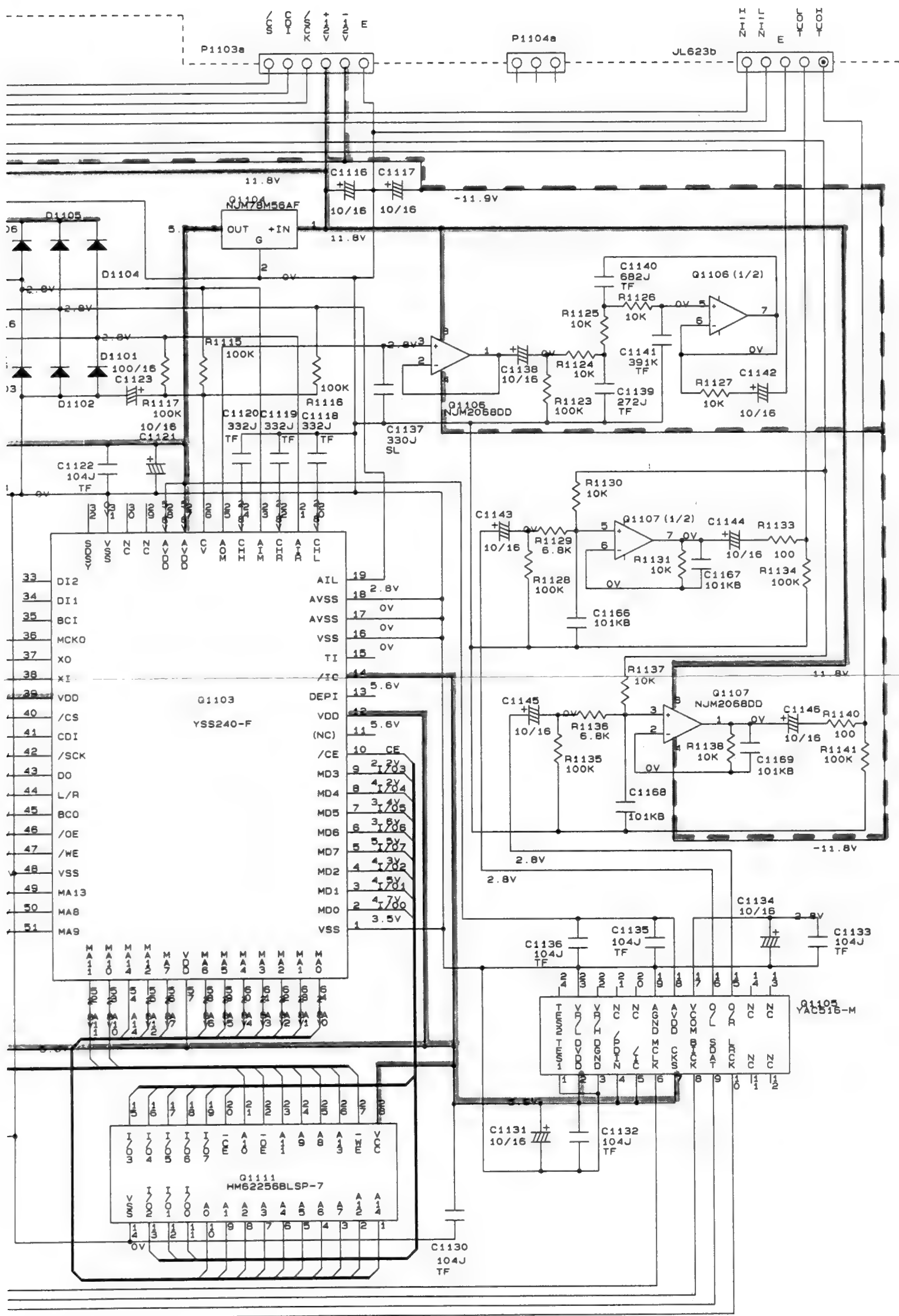






Adjustment points

SCHEMATIC DIAGRAM

TX-SE500

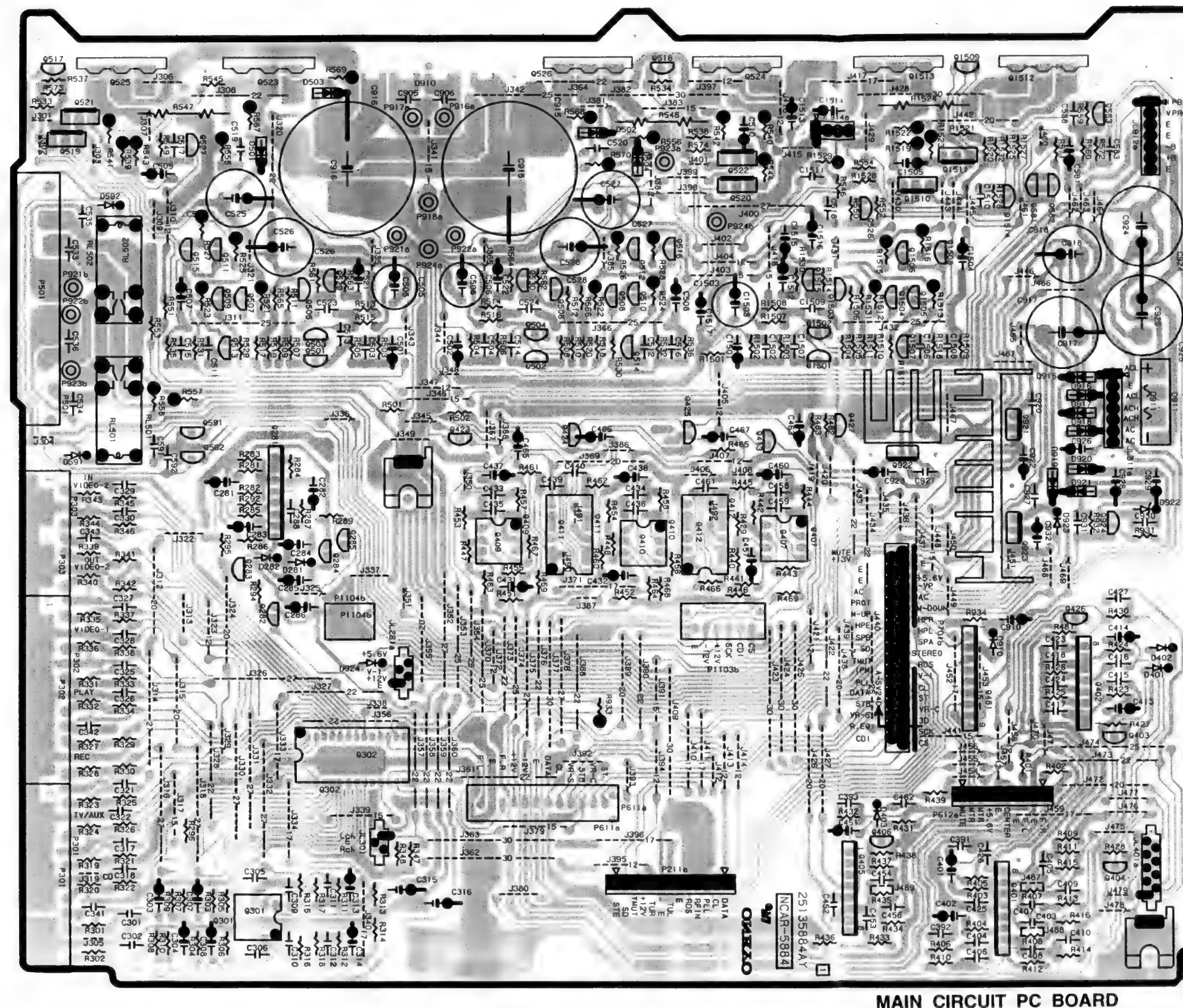




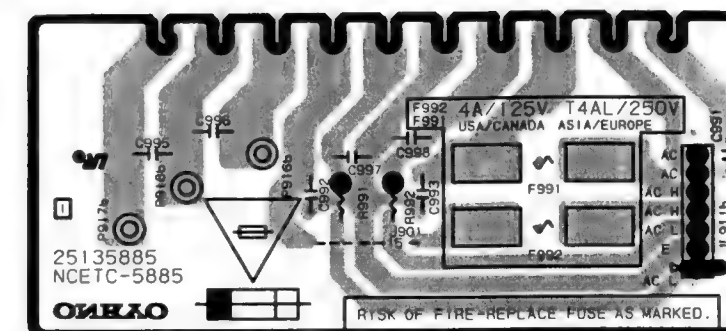
- THE COMPONENTS IDENTIFIED BY MARK  ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE (MEASURED WITH VOLTMETER)  IS DC VOLTAGE. (NO INPUT SIGNAL)
- ALL DIODES ARE EQUIVALENT TO 1SS133 UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS () ARE IN  $\mu\text{F/V}$ .
- ALL CAPACITORS ARE IN  $\text{pF}/50\text{V}$  UNLESS OTHERWISE NOTED.
- EX)  $3\text{pF} \rightarrow 030$ ,  $33\text{pF} \rightarrow 330$ ,  $330\text{pF} \rightarrow 331$ ,  $0.033\mu\text{F} \rightarrow 333$ .
- ALL RESISTORS ARE IN OHMS  $1/6\text{WATTS}$  UNLESS OTHERWISE NOTED.
- THE THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS.
- EX)  PRINTING SIDE
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT



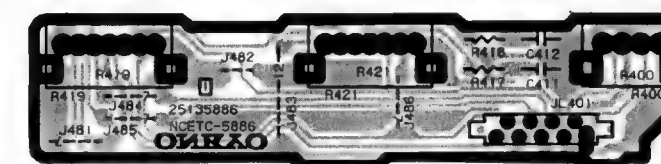
### PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



## MAIN CIRCUIT PC BOARD



## SECONDARY CIRCUIT PC BOARD



## TONE CONTROL CIRCUIT PC BOARD

AS MARKED  
- REPLACE FUSE  
RISK OF FIRE

B901

RL901

RL902

F901

F902

F903

S901

S902

H901

H902

T901

T902

P901

P902

P903

P904

P905

P906

P907

P908

P909

P910

P911

P912

P913

P914

P915

P916

P917

P918

P919

P920

P921

P922

P923

P924

P925

P926

P927

P928

P929

P930

P931

P932

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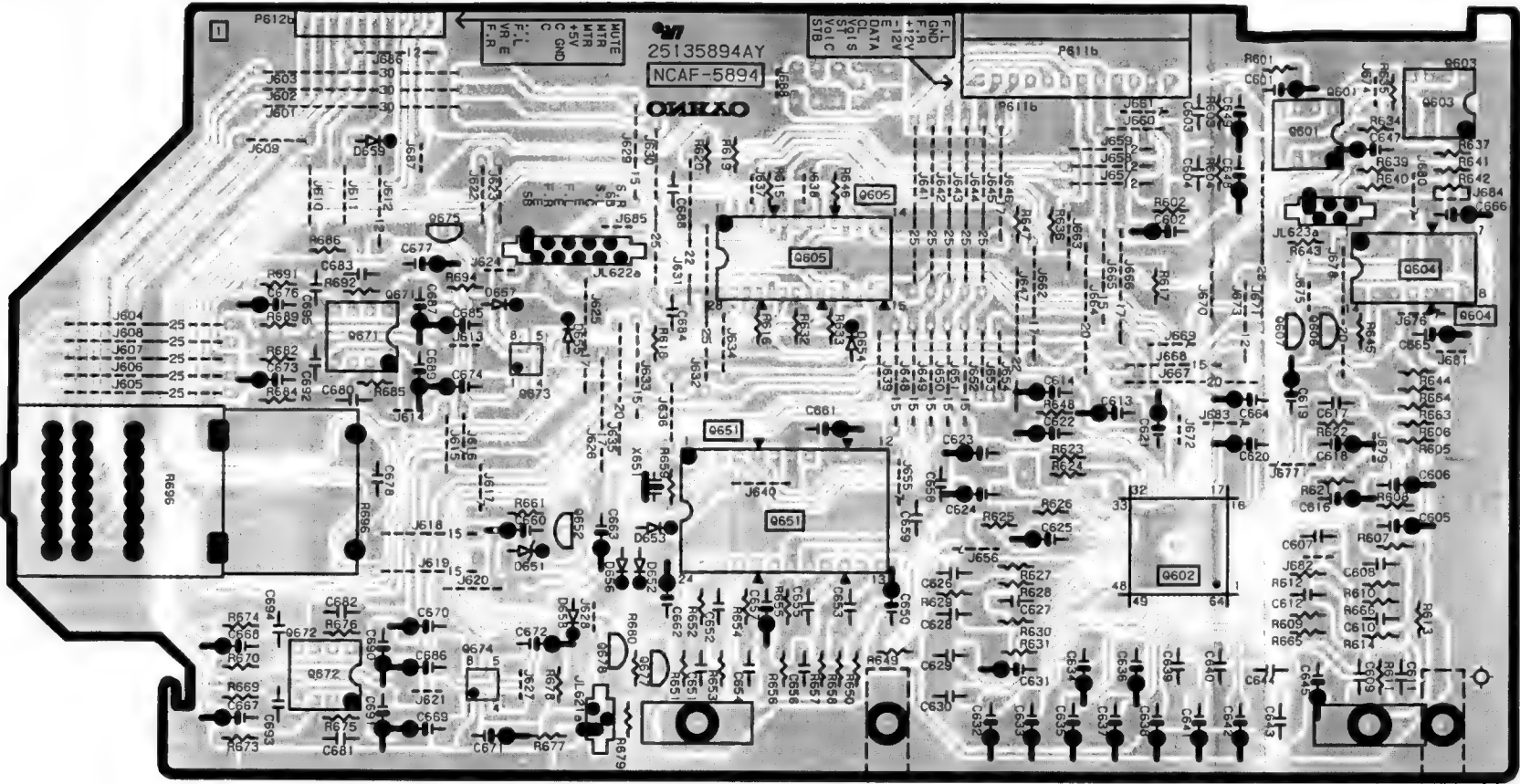
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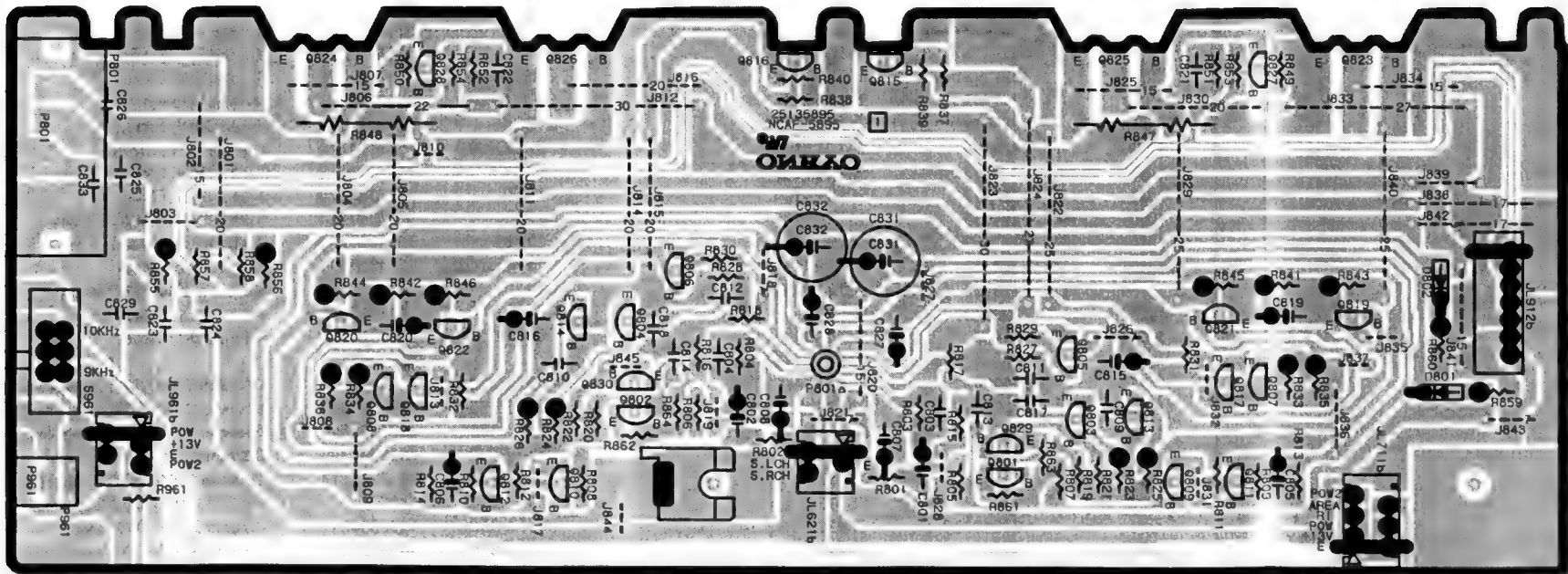
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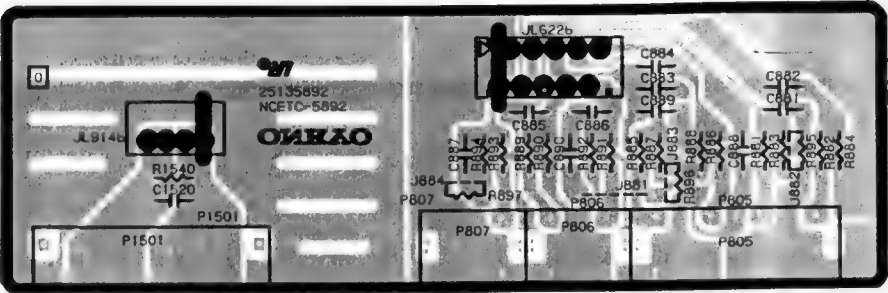
# PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



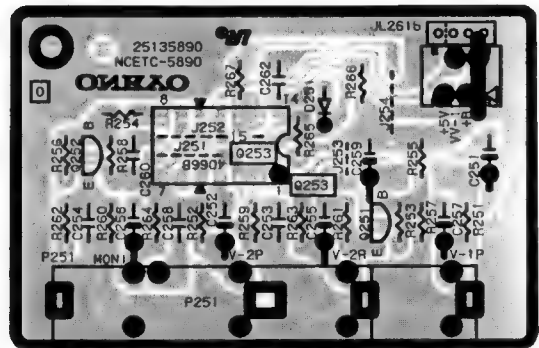
VOLUME CIRCUIT PC BOARD



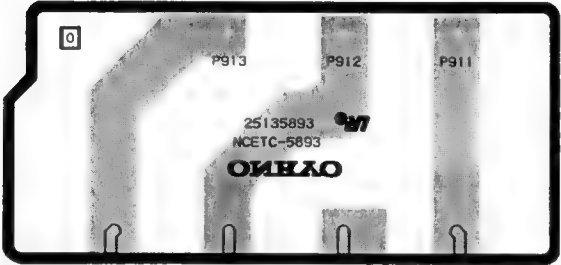
REAR AMPLIFIER PC BOARD



VIDEO TERMINAL PC BOARD

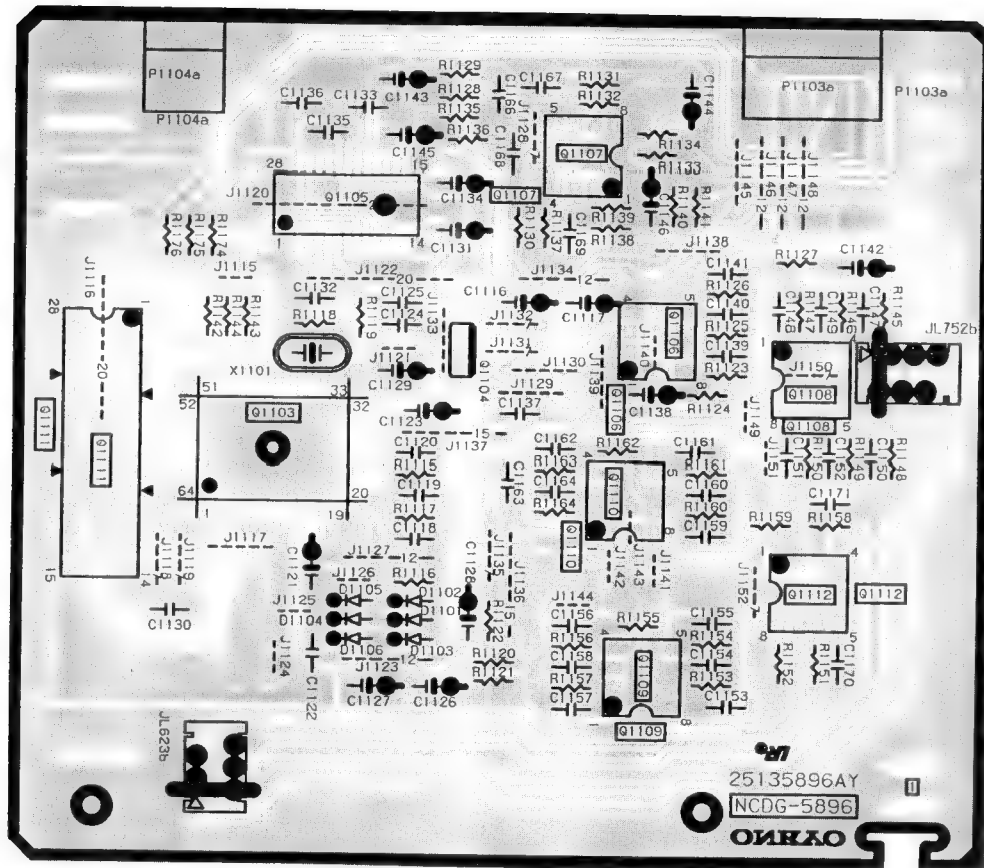


VIDEO TERMINAL PC BOARD

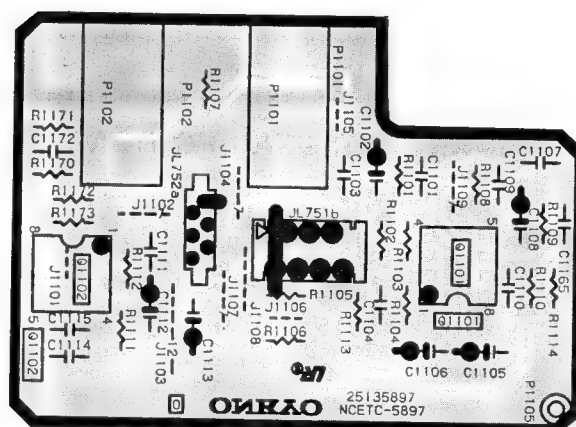


PRIMARY TERMINAL PC BOARD

MODEL TX-SE500 ONLY



DIGITAL CIRCUIT PC BOARD



MIC. TERMINAL PC BOARD



NOTE: &lt;D&gt;:120V model only

&lt;P&gt;:230V model only

&lt;W&gt;:Worldwide model only

CAUTION: Replacement for transistor of mark \*, if necessary,  
must be made from the same beta group (HFE) as  
the original type.

## CIRCUIT BOARD-PARTS LIST

## MAIN CIRCUIT PC BOARD (NAAR-5884-1A/1B/2)

| CIRCUIT NO. | PART NO.           | DESCRIPTION    |
|-------------|--------------------|----------------|
|             | <b>ICs</b>         |                |
| Q281        | 22240293           | NJM4558L-D     |
| Q301        | 2225502            | NJM4558D-X     |
| Q302        | 22240881           | TC9273N-010    |
| Q401,Q402   | 22240250           | NJM2068L-D     |
| Q405        | 22240250           | NJM2068L-D     |
| Q407        | 222956             | NJM2068D-D     |
| Q409,Q410   | 222956             | NJM2068D-D     |
| Q411,Q412   | 22240025           | LC4966         |
| Q481        | 22240239           | TA7291S        |
| Q921        | 222780125NEC       | MPC78M12AHF    |
| Q922        | 222790125          | 79M12HF        |
| Q923        | 222780565JRC       | NJM78M56FA     |
|             | <b>Transistors</b> |                |
| Q282        | 2212600            | DTA124ES       |
| Q283        | 2213816            | 2SD1450-T      |
| Q284        | 2213160            | DTC124ES       |
| Q285        | 2215240            | DTA114TS       |
| Q403,Q404   | 2211945            | 2SK246-GR      |
| Q406        | 2211945            | 2SK246-GR      |
| Q413,Q426   | 2213090            | DTA114YS       |
| Q423,Q425   | 2213631            | RN1241-A       |
| Q427        | 2213510            | DTA114ES       |
| Q501~Q506   | 2211733 or         | * 2SC1845-E or |
|             | 2211732            | * 2SC1845-F    |
| Q507~Q510   | 2211353            | 2SA949-O       |
| Q511,Q512   | 2211633            | 2SC2229-O      |
| Q513,Q514   | 2211353            | 2SA949-O       |
| Q515,Q516   | 2211633            | 2SC2229-O      |
| Q517,Q518   | 2213284            | 2SC1740S-R     |
| Q519,Q520   | 2203010            | 2SC5171        |
| Q521,Q522   | 2203000            | 2SA1930        |
| Q523,Q524   | 2202843 or         | * 2SC5242-O or |
|             | 2202842            | * 2SC5242-R    |
| Q525,Q526   | 2202833 or         | * 2SA1962-O or |
|             | 2202832            | * 2SA1962-R    |
| Q527,Q528   | 2211733 or         | 2SC1845-E or   |
|             | 2211732            | 2SC1845-F      |
| Q529,Q530   | 2213284            | 2SC1740S-R     |
| Q581,Q582   | 2211733 or         | 2SC1845-E or   |
|             | 2211732            | 2SC1845-F      |
| Q583        | 2211792 or         | 2SA992-F or    |
|             | 2211793            | 2SA992-E       |
| Q591,Q592   | 2213640            | DTC123JS       |
| Q924        | 2211455            | 2SA1015-GR     |
| Q1501~Q1503 | 2211733 or         | * 2SC1845-E or |
| Q1514       | 2211732            | * 2SC1845-F    |
| Q1504,Q1505 | 2211353            | 2SA949-O       |
| Q1506,Q1508 | 2211633            | 2SC2229-O      |
| Q1507       | 2211353            | 2SA949-O       |
| Q1509,Q1515 | 2213284            | 2SC1740S-R     |
| Q1510       | 2203010            | 2SC5171        |
| Q1511       | 2203000            | 2SA1930        |
| Q1512       | 2202843 or         | * 2SC5242-O or |
|             | 2202842            | * 2SC5242-R    |
| Q1513       | 2202833 or         | * 2SA1962-O or |
|             | 2202832            | * 2SA1962-R    |
|             | <b>Diodes</b>      |                |
| D281,D282   | 223163             | 1SS133         |
| D401~D403   | 223163             | 1SS133         |
| D501~D504   | 22380032           | 1SR139-100     |
| D591,D592   | 223163             | 1SS133         |
| D910        | 223163             | 1SS133         |
| D911        | 22380021           | △ RS403L       |
| D915~D921   | 22380032           | △ 1SR139-100   |
| D922        | 224473304          | MTZJ33D        |
| D923,D924   | 223163             | 1SS133         |

| CIRCUIT NO. | PART NO.          | DESCRIPTION                           |
|-------------|-------------------|---------------------------------------|
|             | <b>Capacitors</b> |                                       |
| C281~C283   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C284        | 354780229         | 2.2 $\mu$ F,50V, Elect.               |
| C285,C286   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C303,C304   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C307,C308   | 354721019         | 100 $\mu$ F,6.3V, Elect.              |
| C309,C310   | 374726224         | 6200pF $\pm$ 5%, 50V, Plastic         |
| C311,C312   | 374721824         | 1800pF $\pm$ 5%, 50V, Plastic         |
| C313~C316   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C391~C393   | 374721015         | 100pF $\pm$ 10%, 50V, Plastic         |
| C401,C402   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C407~C410   | 374721044         | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic    |
| C413,C414   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C415,C416   | 374721534         | 0.015 $\mu$ F $\pm$ 5%, 50V, Plastic  |
| C417,C418   | 374721015         | 100pF $\pm$ 10%, 50V, Plastic         |
| C427        | 374721044         | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic    |
| C431,C432   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C433~C436   | 374721224         | 1200pF $\pm$ 5%, 50V, Plastic         |
| C437,C438   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C439,C440   | 374722224         | 2200pF $\pm$ 5%, 50V, Plastic         |
| C451,C457   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C454,C456   | 374721044         | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic    |
| C458,C459   | 374721224         | 1200pF $\pm$ 5%, 50V, Plastic         |
| C460,C463   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C461        | 374722224         | 2200pF $\pm$ 5%, 50V, Plastic         |
| C462        | 374721044         | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic    |
| C465~C467   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C501,C502   | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C503,C504   | 374721015         | 100pF $\pm$ 10%, 50V, Plastic         |
| C505,C506   | 354742219         | 220 $\mu$ F,16V, Elect.               |
| C507~C510   | 354781009         | 10 $\mu$ F,50V, Elect.                |
| C519,C520   | 374721044         | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic    |
| C521,C522   | 354744709         | 47 $\mu$ F,16V, Elect.                |
| C525~C528   | 354774719         | 470 $\mu$ F,6.3V, Elect.              |
| C581        | 354721019         | 100 $\mu$ F,6.3V, Elect.              |
| C910        | 354732219         | 220 $\mu$ F,10V, Elect.               |
| C915,C916   | 3504280 or        | 8200 $\mu$ F,56V or                   |
|             | 3504298           | 8200 $\mu$ F,56V, Elect. <D>          |
| C915,C916   | 3504285 or        | 10000 $\mu$ F,56V or                  |
|             | 3504299           | 10000 $\mu$ F,56V, Elect. <P/W/A/T/K> |
| C917        | 354753329         | 3300 $\mu$ F,25V, Elect.              |
| C918        | 354761029         | 1000 $\mu$ F,35V, Elect.              |
| C922,C923   | 354781009         | 10 $\mu$ F,50V, Elect.                |
| C924,C925   | 3504213           | 4700 $\mu$ F,35V, Elect.              |
| C926        | 354781009         | 10 $\mu$ F,50V, Elect.                |
| C928,C929   | 354781019         | 100 $\mu$ F,50V, Elect.               |
| C932        | 354741009         | 10 $\mu$ F,16V, Elect.                |
| C1501       | 354742209         | 22 $\mu$ F,16V, Elect.                |
| C1502       | 374721015         | 100pF $\pm$ 10%, 50V, Plastic         |
| C1503       | 354741019         | 100 $\mu$ F,16V, Elect.               |
| C1504,C1505 | 354781009         | 10 $\mu$ F,50V, Elect.                |
| C1511       | 374721044         | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic    |
| C1512       | 354744709         | 47 $\mu$ F,16V, Elect.                |
| C1513~C1517 | 354781009         | 10 $\mu$ F,50V, Elect.                |
|             | <b>Resistors</b>  |                                       |
| R521~R524   | 443526804         | 68ohm $\pm$ 5%, 1/2W, Metal oxide     |
| R525,R526   | 443525604         | 56ohm $\pm$ 5%, 1/2W, Metal oxide     |
| R527,R528   | 443526804         | △ 68ohm $\pm$ 5%, 1/2W, Metal oxide   |
| R539~R542   | 453530224         | 2.2ohm $\pm$ 5%, 1/2W, Metal          |
| R543,R544   | 443521014         | 100ohm $\pm$ 5%, 1/2W, Metal oxide    |
| R547,R548   | 4800045           | RGC55, 0.1 OHM X2, Metal plate        |
| R555,R556   | 453630824         | 8.2ohm $\pm$ 5%, 1W, Metal            |
| R557,R558   | 443623914         | 390ohm $\pm$ 5%, 1W, Metal oxide      |
| R567~R570   | 453530224         | 2.2ohm $\pm$ 5%, 1/2W, Metal          |
| R933        | 443524704         | 47ohm $\pm$ 5%, 1/2W, Metal oxide     |
| R1512,R1513 | 443526804         | 68ohm $\pm$ 5%, 1/2W, Metal oxide     |
| R1515       | 443525604         | 56ohm $\pm$ 5%, 1/2W, Metal oxide     |
| R1516       | 443526804         | △ 68ohm $\pm$ 5%, 1/2W, Metal oxide   |

| CIRCUIT NO.   | PART NO.                  | DESCRIPTION                          |
|---------------|---------------------------|--------------------------------------|
|               | <b>Resistors</b>          |                                      |
| R1519         | 443521014                 | 100ohm $\pm 5\%$ , 1/2W, Metal oxide |
| R1522,R1523   | 453530224                 | 2.2ohm $\pm 5\%$ , 1/2W, Metal       |
| R1524         | 4800045                   | RGC55, 0.1 Ohm X2, Metal plate       |
| R1529         | 453630824                 | 8.2ohm $\pm 5\%$ , 1W, Metal         |
|               | <b>Relay</b>              |                                      |
| RL501,RL502   | 25065517                  | NRL-2P5A-DC24-098                    |
|               | <b>Terminals</b>          |                                      |
| P301,P302     | 25045458 or<br>25045300   | NPJ-6PDBL279 or<br>NPJ-6PDBL159      |
| P303          | 25045460Y or<br>25045303Y | NPJ-4PDBL280 or<br>NPJ-4PDBL162      |
| P501          | 25060224Y or<br>25060158Y | NTM-8PDML146 or<br>NTM-8PDML084      |
|               | <b>Plugs</b>              |                                      |
| P211a         | 25055709                  | NPLG-13P665                          |
| P612a         | 25055706Y                 | NPLG-10P662                          |
|               | <b>Sockets</b>            |                                      |
| P611a         | 25051752Y                 | NSCT-12P1539                         |
| P701b         | 25050975Y or<br>25051842  | NSCT-35P762<br>NSCT-35P1629          |
| JL261a        | 25051088                  | NSCT-4P875                           |
| JL401a        | 25051093                  | NSCT-9P880                           |
| JL911a,JL912a | 25051111                  | NSCT-7P898                           |
| JL914a        | 25051108                  | NSCT-4P895                           |
| P1103b        | 25051751Y                 | NSCT-6P1538 <SE>                     |
| P1104b        | 25051753Y                 | NSCT-3P1540 <SE>                     |
|               | <b>Radiators</b>          |                                      |
| Q921a         | 27160209                  | RAD-67                               |
| Q922a         | 27160227                  | RAD-076                              |
|               | <b>Screws</b>             |                                      |
| Q921b,Q922b   | 838430107                 | 3TTB+10S(BC), Self-tapping           |

#### SECONDARY CIRCUIT PC BOARD (NAETC-5885-1A/1B/2)

| CIRCUIT NO. | PART NO.  | DESCRIPTION                                    |
|-------------|-----------|--|
| F991a,F992a | 25050065  | △ YSH403T, Fuseholder                          |
| F991,F992   | 252077    | △ 4A-SE-EAK, Fuse <P/A/T/K/W>                  |
| F991,F992   | 252163Y   | △ 4A-UL/T-237, Fuse <D>                        |
| JL911b      | 25051111  | NSCT-7P898, Socket                             |
| C992,C993   | 374721044 | 0.1 $\mu$ F $\pm 5\%$ , 50V, Plastic capacitor |
| C995,C996   | 374731044 | 0.1 $\mu$ F $\pm 5\%$ , 50V, Plastic capacitor |
| C997,C998   | 374721044 | 0.1 $\mu$ F $\pm 5\%$ , 50V, Plastic capacitor |
| R991,R992   | 453530224 | 2.2ohm $\pm 5\%$ , 1/2W, Metal resistor        |

#### TONE CONTROL CIRCUIT PC BOARD (NAETC-5886-1A/1B/2)

| CIRCUIT NO. | PART NO.  | DESCRIPTION                                      |
|-------------|-----------|--|
| R400        | 5104288   | N11RCL250KWT20Z, Variable resistor               |
| R419,R421   | 5104356   | N14RLC100KWT20Z, Variable resistor               |
| JL401b      | 25051093  | NSCT-9P880, Wire holder                          |
| C411,C412   | 374721534 | 0.015 $\mu$ F $\pm 5\%$ , 50V, Plastic capacitor |

#### DISPALY CIRCUIT PC BOARD (NADIS-5887-1A/1B/1C/1D/1E/1F/2A/2B/2C)

| CIRCUIT NO. | PART NO.             | DESCRIPTION                 |
|-------------|----------------------|-----------------------------|
|             | <b>Remote sensor</b> |                             |
| U701        | 24130011             | PIC-12043TE2, Remote sensor |
|             | <b>FL tube</b>       |                             |
| Q702        | 212156               | 12-BT-101GK                 |
|             | <b>ICs</b>           |                             |
| Q701        | 22241059             | $\mu$ PD78043FGF-018        |
| Q751        | 22240679             | $\mu$ PC1346CS <P>          |
|             | <b>Transistors</b>   |                             |
| Q703        | 221282               | DTC144ES                    |
| Q705,Q706   | 2213284              | 2SC1740S-R                  |
| Q707        | 2213510              | DTA114ES                    |
|             | <b>Diodes</b>        |                             |
| D701D702    | 223163               | 1SS133                      |
| D703        | 224471203            | MTZJ12C, Zener              |

| CIRCUIT NO. | PART NO.                  | DESCRIPTION                                |
|-------------|---------------------------|--|
|             | <b>Diodes</b>             |  |
| D704,D705   | 223163                    | 1SS133                                     |
| D706,D707   | 224470562                 | MTZJ5.6B, Zener                            |
| D708        | 223163                    | 1SS133                                     |
| D709        | 225290                    | SEL4110R, LED                              |
| D710-D712   | 223163                    | 1SS133                                     |
| D751        | 223163                    | 1SS133 <P>                                 |
|             | <b>Coils</b>              |  |
| L701-L703   | 233454K220                | NCH-1452, 220K, Choke                      |
|             | <b>Resonators</b>         |  |
| X701        | 3010163                   | CST4.19MGW, Ceramic                        |
| X751        | 3010203                   | AF6146CG, Crystal <P>                      |
|             | <b>Capacitors</b>         |  |
| C701        | 3000075                   | EECS5R5T473, Super                         |
| C702        | 375524744                 | 0.47 $\mu$ F $\pm 5\%$ , 50V, Plastic      |
| C703        | 355721019                 | 100 $\mu$ F, 6.3V, Elect.                  |
| C704        | 355780109                 | 1 $\mu$ F, 50V, Elect.                     |
| C706,C707   | 355780109                 | 1 $\mu$ F, 50V, Elect.                     |
| C709,C711   | 355721019                 | 100 $\mu$ F, 6.3V, Elect.                  |
| C751        | 354721019                 | 100 $\mu$ F, 6.3V, Elect. <P>              |
| C754,C760   | 374724724                 | 4700pF $\pm 5\%$ , 50V, Plastic <P>        |
| C755,C756   | 374723324                 | 3300pF $\pm 5\%$ , 50V, Plastic <P>        |
| C757        | 354780229                 | 2.2 $\mu$ F, 50V, Elect. <P>               |
| C758        | 374724734                 | 0.047 $\mu$ F $\pm 5\%$ , 50V, Plastic <P> |
| C759        | 374722234                 | 0.022 $\mu$ F $\pm 5\%$ , 50V, Plastic <P> |
|             | <b>Resistors</b>          |  |
| R798        | 5210265                   | N06HR50KBC, Trimming <P>                   |
| R1167-R1169 | 5104393Y                  | N11RL10KB17Z, Variable <SE>                |
|             | <b>Switches</b>           |  |
| S701        | 25035652                  | NPS-111-S604, Push <D>                     |
| S702-S704   | 25035652                  | NPS-111-S604, Push                         |
| S705,S706   | 25035652                  | NPS-111-S604, Push <SE>                    |
| S707-S738   | 25035652                  | NPS-111-S604, Push                         |
| S739        | 25035653                  | NPS-122-L605, Push <P/W/T/A/K>             |
|             | <b>Sockets and Holder</b> |  |
| JL711a      | 25051090                  | NSCT-6P877 or                              |
| JL711a      | 25051879                  | NSCT-35P1666                               |
| P701        | 25055038                  | NPLG-2P29 <P>                              |
| P701a       | 25050941Y or<br>25051842Y | NSCT-35P728 or<br>NSCT-35P1269             |
| JL751a      | 25051091                  | NSCT-7P878 <SE>                            |
|             | <b>Holder</b>             |  |
| Q702a       | 27190989                  | Holder FL                                  |

#### TUNER CIRCUIT PC BOARD (NARF-5888-1A/1B/1C/1D/1E/1F/2A/2B/2C)

| CIRCUIT NO. | PART NO.              | DESCRIPTION                      |
|-------------|-----------------------|----------------------------------|
|             | <b>Front end</b>      |                                  |
| TU001       | 240098                | ENV172D1G1, Front end <D>        |
| TU001       | 240102                | FE417-G02, Front end <P/W/T/A/K> |
|             | <b>ICs</b>            |                                  |
| Q121        | 22240090              | LM7001                           |
| Q141        | 22240983              | LA1851N-F                        |
|             | <b>Transistors</b>    |                                  |
| Q101        | 2210746               | 2SC945A-P <P/W/T/A/K>            |
| Q102        | 2211723               | 2SC1923-O                        |
| Q122,Q142   | 2213510 or            | DTA114ES or                      |
| Q175        | 2214350               | RN2202                           |
| Q123        | 2212445               | 2SK365-GR                        |
| Q124        | 2212115 or            | 2SC2458-GR or                    |
| Q171,Q172   | 2213284               | 2SC1740S-R                       |
| Q143        | 221282                | DTC144ES                         |
| Q144        | 2213640               | DTC123JS                         |
| Q173,Q174   | 2212794               | 2SD1468-R                        |
| Q182        | 2212115 or<br>2213284 | 2SC2458-GR or<br>2SC1740S-R <P>  |
|             | <b>Diode</b>          |                                  |
| D165        | 224470512             | MTZJ5.1B, Zener                  |

NOTE: THE COMPONENTS IDENTIFIED BY MARK  $\Delta$   
ARE CRITICAL FOR RISK OF FIRE AND  
ELECTRIC SHOCK. REPLACE ONLY WITH  
PART NUMBER SPECIFIED.

| CIRCUIT NO.                   | PART NO.   | DESCRIPTION                                     |
|-------------------------------|------------|---|
| <b>Coils and transformers</b> |            |   |
| L101                          | 233457     | NFIF-4081, IF Transformer                       |
| L102                          | 233458     | NFIF-4082, IF Transformer                       |
| L103                          | 233471     | NMC-6084 <P/W/T/A/K>                            |
| L104                          | 233454K220 | NCH-1452, 220K, Choke coil                      |
| L105                          | 232174     | NMRF-5077, RF block                             |
| L106                          | 232139     | NMIF-4062, IF transformer                       |
| L107,L108                     | 233484     | NMC-4085 <P/W/T/A/K>                            |
| L109,L110                     | 231092     | NCH-2140, Choke coil <D>                        |
| <b>Capacitors</b>             |            |   |
| C001                          | 354741019  | 100 $\mu$ F, 16V, Elect.                        |
| C109,C110                     | 374722724  | 2700pF $\pm$ 5%, 50V, Plastic <P/W/T/A/K>       |
| C127                          | 354721019  | 100 $\mu$ F, 6.3V, Elect.                       |
| C130                          | 354780229  | 2.2 $\mu$ F, 50V, Elect.                        |
| C131                          | 374722234  | 0.022 $\mu$ F $\pm$ 5%, 50V, Plastic            |
| C132,C153                     | 354783399  | 0.33 $\mu$ F, 50V, Elect.                       |
| C133,C142                     | 354741019  | 100 $\mu$ F, 16V, Elect.                        |
| C145,C154                     | 354741009  | 10 $\mu$ F, 16V, Elect.                         |
| C146                          | 374723324  | 3300pF $\pm$ 5%, 50V, Plastic                   |
| C147                          | 374721034  | 0.01 $\mu$ F $\pm$ 5%, 50V, Plastic <P/W/T/A/K> |
|                               | 374721534  | 0.015 $\mu$ F $\pm$ 5%, 50V, Plastic <D>        |
| C149                          | 354780479  | 4.7 $\mu$ F, 50V, Elect.                        |
| C151,C152                     | 354780109  | 1 $\mu$ F, 50V, Elect.                          |
| C155,C156                     | 374721034  | 0.01 $\mu$ F $\pm$ 5%, 50V, Plastic <D>         |
|                               | 374724724  | 4700pF $\pm$ 5%, 50V, Plastic <P/T/A/K>         |
|                               | 374725624  | 5600pF $\pm$ 5%, 50V, Plastic <W>               |
| C159,C177                     | 354780229  | 2.2 $\mu$ F, 50V, Elect.                        |
| C160                          | 354784799  | 0.47 $\mu$ F, 50V, Elect.                       |
| C162,C166                     | 354741009  | 10 $\mu$ F, 16V, Elect.                         |
| C171,C172                     | 354741009  | 10 $\mu$ F, 16V, Elect.                         |
| C173,C174                     | 374721024  | 1000pF $\pm$ 5%, 50V, Plastic <D>               |
| C178                          | 354741009  | 10 $\mu$ F, 16V, Elect.                         |
| <b>Oscillators</b>            |            |   |
| X104                          | 3010268    | CSB456F23, Ceramic                              |
| X121                          | 3010141    | XTL-7.2M, Crystal                               |
| <b>Ceramic filters</b>        |            |   |
| X101,X103                     | 3010071    | SFE10.7MA5(RED)                                 |
| X102                          | 3010130    | SFE10.7MZ2A <P/W/T/A/K>                         |
| X105                          | 3010123    | SFZ-450JL                                       |
| <b>Resistors</b>              |            |   |
| R150                          | 5210261    | N06HR5KBC, Trimming                             |
| R158                          | 5210264    | N06HR30KBC, Trimming                            |
| <b>Terminals</b>              |            |   |
| P101                          | 25060117   | NTM-2PDML051 or                                 |
|                               | 25060222   | NTM-2PDML144 <P/W/T/A/K>                        |
|                               | 25060195   | NTM-4PDML117 or                                 |
|                               | 25060239   | NTM-4PDML161 <D>                                |
| <b>Plug</b>                   |            |   |
| TP101                         | 25055038Y  | NPLG-2P29                                       |
| <b>Socket</b>                 |            |   |
| P211b                         | 25051238   | NSCT-13P1028                                    |

#### POWER SUPPLY CIRCUIT PC BOARD (NAPS-5889-1A/1B/1C/1D/1E/1F/2A/2B/2C)

| CIRCUIT NO.              | PART NO.              | DESCRIPTION                          |
|--------------------------|-----------------------|--------------------------------------|
| <b>Transistor</b>        |                       |                                      |
| Q951                     | 2213640               | DTC123JS                             |
| <b>Diodes</b>            |                       |                                      |
| D951,D953                | 22380032              | 1SR139-100 <P/W/T/A/K>               |
| D952                     | 22380032              | 1SR139-100                           |
| D954                     | 22380032              | 1SR139-100 <P/W/T/A/K>               |
| D955                     | 223163                | ISS133                               |
| <b>Power transformer</b> |                       |                                      |
| T902                     | 2300670AY or $\Delta$ | NPT-1111D or                         |
|                          | 2301258Y $\Delta$     | NPT-1294D, Power transformer <D>     |
|                          | 2300671A $\Delta$     | NPT-1111P, Power transformer <P/T/A> |
|                          | 2300672AY $\Delta$    | NPT-1111DG, Power transformer <W/K>  |

| CIRCUIT NO.        | PART NO.  | DESCRIPTION                              |
|--------------------|-----------|--|
| <b>Capacitors</b>  |           |  |
| C901               | 3500191   | $\Delta$ DE7150F-103M, AC400V/125V, IS   |
| C952               | 354743319 | 330 $\mu$ F, 16V, Elect.                 |
| <b>Fuseholders</b> |           |  |
| F901a              | 25050065  | $\Delta$ YSH403T, Fuseholder <D/W>       |
| F902a              | 25050065  | $\Delta$ YSH403T, Fuseholder <P/T/A/K>   |
| F903a              | 25050065  | $\Delta$ YSH403T, Fuseholder <P/T>       |
| <b>Fuses</b>       |           |  |
| F901               | 252164Y   | $\Delta$ 5A-UL/T-237, Fuse <D/W>         |
| F902               | 252076    | $\Delta$ 3.15A-SE-EAK, Fuse <P/A/T/K/W>  |
| F903               | 252075    | $\Delta$ 2.5A-SE-EAK, Fuse <P/T>         |
| <b>Holder</b>      |           |  |
| JL961a             | 25051088  | NSCT-4P875, Wire                         |
| P901a              | 25055675Y | NPLG-2P631, Plug                         |
| <b>Terminal</b>    |           |  |
| P902               | 25051126Y | $\Delta$ NSCT-4P913, AC outlet <D>       |
| P903               | 25051125Y | $\Delta$ NSCT-4P912, AC outlet <P/W/T>   |
| <b>Resistors</b>   |           |  |
| R901               | 431533355 | $\Delta$ 3.3 Mohm, 1/2W, Solid <D>       |
| R951               | 453530824 | 8.2ohm $\pm$ 5%, 1/2W, Metal <P/W/T/A/K> |
| <b>Relay</b>       |           |  |
| RL901              | 25065515  | $\Delta$ NRL-1P5A-DC12-096               |
| <b>Switch</b>      |           |  |
| S901               | 25065437  | $\Delta$ NSS-22157P, Slide <W>           |

#### VIDEO TERMINAL PC BOARD

(NAETC-5890-1A/1B/1C/1D/1E/1F/2A/2B/2C)

| CIRCUIT NO. | PART NO.  | DESCRIPTION                         |
|-------------|-----------|-------------------------------------|
| Q253        | 222840661 | 4066B, IC                           |
| Q251,Q252   | 2213284   | 2SC1740S-R, Transistor              |
| D251        | 223163    | 1SS133, Diode                       |
| C251,C252   | 354721019 | 100 $\mu$ F, 6.3V, Elect. capacitor |
| C255,C256   | 354724719 | 470 $\mu$ F, 6.3V, Elect. capacitor |
| C257        | 354721019 | 100 $\mu$ F, 6.3V, Elect. capacitor |
| C259        | 354741019 | 100 $\mu$ F, 16V, Elect. capacitor  |
| JL261b      | 25055625  | NPLG-4P587, Wire trap               |
| P251        | 25045339  | NPJ-4PDYE190, Terminal              |

#### HEADPHONE TERMINAL PC BOARD

(NAETC-5891-1A/1B/1C/1D/1E/1F/2A/2B/2C)

| CIRCUIT NO. | PART NO.  | DESCRIPTION           |
|-------------|-----------|-----------------------|
| P503        | 25045255Y | YKB21-5009, Headphone |

#### VIDEO TERMINAL PC BOARD

(NAETC-5892-1A/1B/1C/1D/1E/1F/2A/2B/2C)

| CIRCUIT NO. | PART NO.     | DESCRIPTION              |
|-------------|--------------|--------------------------|
| JL914b      | 25050281     | NSCT-4P109, Wire trap    |
| JL622b      | 25055631     | NPLG-10P593, Wire trap   |
| P1501       | 25060114     | NTM-2PDMLN1048, Terminal |
| P805        | 25045460Y    | NPJ-4PDBL281, Terminal   |
| P806        | 25045456Y    | NPJ-2PDBL277, Terminal   |
| P807        | 25045459Y or | NPJ-1PDBL280 or          |
|             | 25045302Y    | NPJ-1PDBL161, Terminal   |

#### VOLUME CIRCUIT PC BOARD (NAAF-5894-1A/1B/1C/2/2A)

| CIRCUIT NO. | PART NO.    | DESCRIPTION |
|-------------|-------------|-------------|
| <b>ICs</b>  |             |             |
| Q601,Q603   | 222502      | NJM4558D-X  |
| Q602        | 22241053    | NJW1102AF   |
| Q604        | 222840661   | 4066B <SE>  |
| Q605        | 22240800    | TC9164AN    |
| Q651        | 22240995 or | NJU9702D or |
|             | 22240686    | M65830P     |
| Q671,Q672   | 222956      | NJM2068D-D  |
| Q673,Q674   | 22241054    | M62429FP    |

## REAR AMPLIFIER PC BOARD (NAAF-5895-1A/1B/1C/2/2A)

| CIRCUIT NO. | PART NO.              | DESCRIPTION                          |
|-------------|-----------------------|--------------------------------------|
|             | <b>Transistors</b>    |                                      |
| Q801,Q802   | 2211732 or<br>2215116 | 2SC1845-F or<br>2SC1775-F            |
| Q803~Q806   | 2211353               | 2SA949-O                             |
| Q807,Q808   | 2211633               | 2SC2229-O                            |
| Q809,Q810   | 2211732 or<br>2215116 | 2SC1845-F or<br>2SC1775-F            |
| Q811,Q812   | 2213284               | 2SC1740S-R                           |
| Q813,Q814   | 2211353               | 2SA949-O                             |
| Q815,Q816   | 2213284               | 2SC1740S-R                           |
| Q817,Q818   | 2211633               | 2SC2229-O                            |
| Q819,Q820   | 2215163               | 2SD667A-C                            |
| Q821,Q822   | 2215173               | 2SB647A-C                            |
| Q823,Q824   | 2202923 or<br>2202922 | * 2SC5196-O or<br>* 2SC5196-R        |
| Q825,Q826   | 2202913 or<br>2202912 | * 2SA1939-O or<br>* 2SA1939-R        |
| Q827~Q830   | 2211732 or<br>2215116 | 2SC1845-F or<br>2SC1775-F            |
|             | <b>Diode</b>          |                                      |
| D801,D802   | 22380032              | 1SR139-100                           |
|             | <b>Capacitors</b>     |                                      |
| C801,C802   | 354742209             | 22 $\mu$ F,16V, Elect.               |
| C805,C806   | 354744709             | 47 $\mu$ F,16V, Elect.               |
| C807,C808   | 354741019             | 100 $\mu$ F,16V, Elect.              |
| C815,C816   | 354781009             | 10 $\mu$ F,50V, Elect.               |
| C819,C820   | 354781009             | 10 $\mu$ F,50V, Elect.               |
| C823,C824   | 374724734             | 0.047 $\mu$ F $\pm$ 5%, 50V, Plastic |
| C827,C828   | 354764709             | 47 $\mu$ F,35V, Elect.               |
| C831,C832   | 354762219             | 220 $\mu$ F,35V, Elect.              |
|             | <b>Resistors</b>      |                                      |
| R823~R826   | 443526804             | 68ohm $\pm$ 5%, 1/2W, Metal oxide    |
| R833,R834   | 443525604             | 56ohm $\pm$ 5%, 1/2W, Metal oxide    |
| R835,R836   | 443526804             | 68ohm $\pm$ 5%, 1/2W, Metal oxide    |
| R841,R842   | 443521014             | 100ohm $\pm$ 5%, 1/2W, Metal oxide   |
| R843~R846   | 453530224             | 2.2ohm $\pm$ 5%, 1/2W, Metal         |
| R847,R848   | 4800047               | RG22,0.1 ohm $\times$ 2, Metal plate |
| R855,R856   | 453630824             | 8.2ohm $\pm$ 5%, 1W, Metal           |
| R859,R860   | 453530224             | 2.2ohm $\pm$ 5%, 1/2W, Metal         |
|             | <b>Wire traps</b>     |                                      |
| JL621b      | 25055624              | NPLG-3P586                           |
| JL711b      | 25055627              | NPLG-6P589                           |
| JL912b      | 25050271              | NSCT-7P99                            |
| JL961b      | 25055625              | NPLG-4P587                           |
|             | <b>Switch</b>         |                                      |
| S961        | 25065286              | NSS-22112, Slide <W>                 |
|             | <b>Terminals</b>      |                                      |
| P961        | 25045439Y             | NPJ-1PDBL263                         |
| P801        | 25060161Y             | NTM-4PDMNL087                        |

## DIGITAL CIRCUIT PC BOARD (NADG-5896-1)

TX-SE500 only

| CIRCUIT NO. | PART NO.          | DESCRIPTION   |
|-------------|-------------------|---------------|
|             | <b>ICs</b>        |               |
| Q1103       | 22241060          | YSS240        |
| Q1104       | 222780565JRC      | NIM78M56FA    |
| Q1105       | 22241061          | YAC516        |
| Q1106~Q1110 | 222956            | NJM2068D-D    |
| Q1111       | 22241062          | HM62256BLSP-7 |
| Q1112       | 222956            | NJM2068D-D    |
|             | <b>Diodes</b>     |               |
| D1101~D1106 | 223163            | 1SS133        |
|             | <b>Oscillator</b> |               |
| X1101       | 3010112           | KD6586FFB     |

| CIRCUIT NO. | PART NO.           | DESCRIPTION                          |
|-------------|--------------------|--------------------------------------|
|             | <b>Transistors</b> |                                      |
| Q606        | 221281             | DTC114YS <SE>                        |
| Q607        | 2213090            | DTA114YS <SE>                        |
| Q652        | 2215163            | 2SD667A-C                            |
| Q675        | 2213631            | RN1241-A                             |
| Q677,Q678   | 2213631            | RN1241-A                             |
|             | <b>Oscillator</b>  |                                      |
| X651        | 3010217            | CST2.04MG040, Ceramic                |
|             | <b>Diodes</b>      |                                      |
| D651        | 224470682          | MTZJ6.8B, Zener                      |
| D652~D657   | 223163             | 1SS133                               |
| D659        | 223163             | 1SS133                               |
|             | <b>Capacitors</b>  |                                      |
| C601,C602   | 354780229          | 2.2 $\mu$ F,50V, Elect.              |
| C605,C606   | 354781009          | 10 $\mu$ F,50V, Elect.               |
| C607~C610   | 374721044          | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic   |
| C611,C612   | 374726814          | 680pF $\pm$ 5%, 50V, Plastic         |
| C613,C614   | 354741009          | 10 $\mu$ F,16V, Elect.               |
| C616,C619   | 354742209          | 22 $\mu$ F,16V, Elect.               |
| C617        | 374724724          | 4700pF $\pm$ 5%, 50V, Plastic        |
| C618,C657   | 354744709          | 47 $\mu$ F,16V, Elect.               |
| C620~C622   | 354741009          | 10 $\mu$ F,16V, Elect.               |
| C623,C638   | 354781099          | 0.1 $\mu$ F,50V, Elect.              |
| C624        | 354741009          | 10 $\mu$ F,16V, Elect.               |
| C625        | 354722219          | 220 $\mu$ F,6.3V, Elect.             |
| C627        | 374725614          | 560pF $\pm$ 5%, 50V, Plastic         |
| C628        | 374721024          | 1000pF $\pm$ 5%, 50V, Plastic        |
| C629,C656   | 374725624          | 5600pF $\pm$ 5%, 50V, Plastic        |
| C630        | 374724734          | 0.047 $\mu$ F $\pm$ 5%, 50V, Plastic |
| C631        | 354786899          | 0.68 $\mu$ F,50V, Elect.             |
| C632,C633   | 354782299          | 0.22 $\mu$ F,50V, Elect.             |
| C634,C635   | 354780479          | 4.7 $\mu$ F,50V, Elect.              |
| C636,C637   | 354782299          | 0.22 $\mu$ F,50V, Elect.             |
| C639,C640   | 374724734          | 0.047 $\mu$ F $\pm$ 5%, 50V, Plastic |
| C641,C642   | 354781099          | 0.1 $\mu$ F,50V, Elect.              |
| C643,C644   | 374722234          | 0.022 $\mu$ F $\pm$ 5%, 50V, Plastic |
| C645        | 354781099          | 0.1 $\mu$ F,50V, Elect.              |
| C647~C649   | 354741009          | 10 $\mu$ F,16V, Elect.               |
| C650        | 354780479          | 4.7 $\mu$ F,50V, Elect.              |
| C651        | 374722224          | 2200pF $\pm$ 5%, 50V, Plastic        |
| C652,C653   | 374725614          | 560pF $\pm$ 5%, 50V, Plastic         |
| C654,C655   | 374721044          | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic   |
| C658,C659   | 374724734          | 0.047 $\mu$ F $\pm$ 5%, 50V, Plastic |
| C660        | 354781009          | 10 $\mu$ F,50V, Elect.               |
| C661,C662   | 354721019          | 100 $\mu$ F,6.3V, Elect.             |
| C663        | 354741009          | 10 $\mu$ F,16V, Elect.               |
| C664        | 354741019          | 100 $\mu$ F,16V, Elect.              |
| C665,C666   | 354741009          | 10 $\mu$ F,16V, Elect. <SE>          |
| C667,C668   | 354741009          | 10 $\mu$ F,16V, Elect.               |
| C669,C670   | 354780229          | 2.2 $\mu$ F,50V, Elect.              |
| C671~C673   | 354741009          | 10 $\mu$ F,16V, Elect.               |
| C674        | 354780229          | 2.2 $\mu$ F,50V, Elect.              |
| C676,C677   | 354741009          | 10 $\mu$ F,16V, Elect.               |
| C685,C686   | 354721019          | 100 $\mu$ F,6.3V, Elect.             |
| C687        | 354741009          | 10 $\mu$ F,16V, Elect.               |
| C689~C691   | 354741009          | 10 $\mu$ F,16V, Elect.               |
|             | <b>Resistor</b>    |                                      |
| R696        | 5104392            | N16RFL50KA25F, Variable              |
|             | <b>Sockets</b>     |                                      |
| JL621a      | 25051087           | NSCT-3P874                           |
| JL622a      | 25051094           | NSCT-10P881                          |
| P611b       | 25055885Y          | NPLG-12P841                          |
| P612b       | 25051235Y          | NSCT-10P1025                         |

| CIRCUIT NO.       | PART NO.  | DESCRIPTION                        |
|-------------------|-----------|------------------------------------|
| <b>Capacitors</b> |           |                                    |
| C1116,C1117       | 354741009 | 10 $\mu$ F,16V, Elect.             |
| C1118,C1120       | 374723324 | 3300pF $\pm$ 5%, 50V, Plastic      |
| C1121,C1131       | 354741009 | 10 $\mu$ F,16V, Elect.             |
| C1122             | 374721024 | 1000pF $\pm$ 5%, 50V, Plastic      |
| C1123             | 354741019 | 100 $\mu$ F,16V, Elect.            |
| C1126,C1129       | 354741009 | 10 $\mu$ F,16V, Elect.             |
| C1130,C1165       | 374721044 | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic |
| C1132,C1133       | 374721044 | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic |
| C1134,C1138       | 354741009 | 10 $\mu$ F,16V, Elect.             |
| C1135,C1136       | 374721044 | 0.1 $\mu$ F $\pm$ 5%, 50V, Plastic |
| C1139,C1147       | 374722724 | 2700pF $\pm$ 5%, 50V, Plastic      |
| C1140,C1148       | 374726824 | 6800pF $\pm$ 5%, 50V, Plastic      |
| C1141,C1149       | 374723915 | 390pF $\pm$ 10%, 50V, Plastic      |
| C1142,C1146       | 354741009 | 10 $\mu$ F,16V, Elect.             |
| C1150,C1156       | 374722724 | 2700pF $\pm$ 5%, 50V, Plastic      |
| C1151,C1154       | 374726824 | 6800pF $\pm$ 5%, 50V, Plastic      |
| C1152,C1158       | 374723915 | 390pF $\pm$ 10%, 50V, Plastic      |
| C1153,C1159       | 374721824 | 1800pF $\pm$ 5%, 50V, Plastic      |
| C1155,C1161       | 374722715 | 270pF $\pm$ 10%, 50V, Plastic      |
| C1157,C1160       | 374726824 | 6800pF $\pm$ 5%, 50V, Plastic      |
| C1162             | 374722724 | 2700pF $\pm$ 5%, 50V, Plastic      |
| C1163             | 374726824 | 6800pF $\pm$ 5%, 50V, Plastic      |
| C1164             | 374723915 | 390pF $\pm$ 10%, 50V, Plastic      |
| C1170,C1171       | 374721015 | 100pF $\pm$ 10%, 50V, Plastic      |
| <b>Plugs</b>      |           |                                    |
| JL623b            | 25055626Y | NPLG-5P588                         |
| JL752b            | 25055672Y | NPLG-6P589                         |
| P1103a            | 25055884Y | NPLG-6P840                         |
| P1104a            | 25055889Y | NPLG-3P842                         |

**MIC. TERMINAL PC BOARD (NAETC-5897-1)**

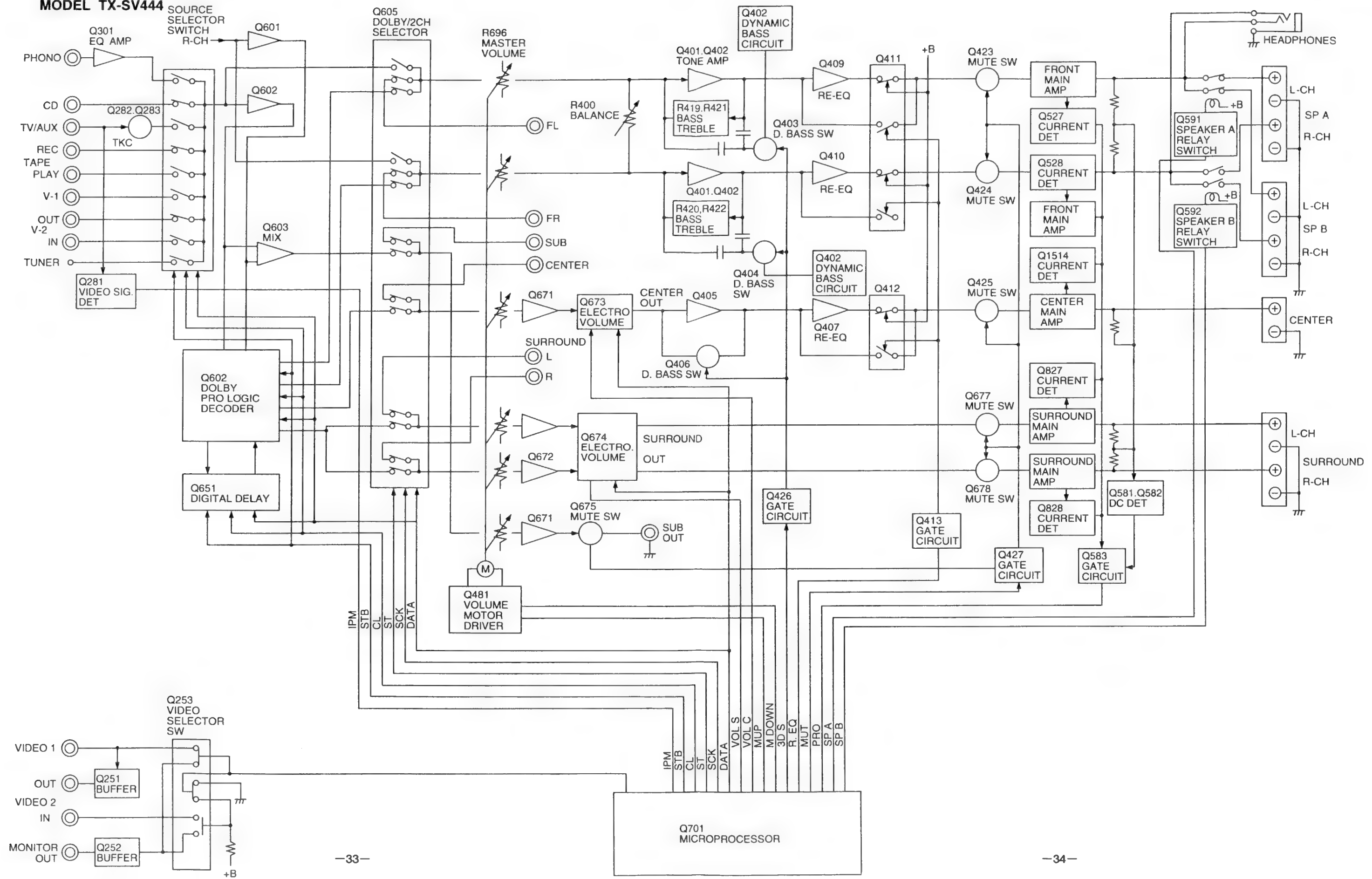
TX-SE500 only

| CIRCUIT NO.       | PART NO.  | DESCRIPTION                   |
|-------------------|-----------|-------------------------------|
| <b>ICs</b>        |           |                               |
| Q1101,Q1102       | 222956    | NJM2068D-D                    |
| <b>Capacitors</b> |           |                               |
| C1101             | 374721015 | 100pF $\pm$ 10%, 50V, Plastic |
| C1102             | 354744709 | 47 $\mu$ F,16V, Elect.        |
| C1103             | 374722224 | 2200pF $\pm$ 5%, 50V, Plastic |
| C1104             | 374721215 | 120pF $\pm$ 10%, 50V, Plastic |
| C1105,C1106       | 354741019 | 100 $\mu$ F,16V, Elect.       |
| C1107             | 374721015 | 100pF $\pm$ 10%, 50V, Plastic |
| C1108             | 354744709 | 47 $\mu$ F,16V, Elect.        |
| C1109             | 374722224 | 2200pF $\pm$ 5%, 50V, Plastic |
| C1110             | 374721215 | 120pF $\pm$ 10%, 50V, Plastic |
| C1111             | 374721024 | 1000pF $\pm$ 5%, 50V, Plastic |
| C1112             | 354742209 | 22 $\mu$ F,16V, Elect.        |
| C1113             | 354744709 | 47 $\mu$ F,16V, Elect.        |
| C1114,C1115       | 374721015 | 100pF $\pm$ 10%, 50V, Plastic |
| <b>Terminals</b>  |           |                               |
| P1101,P1102       | 25045492Y | NPJ-1PDBL309                  |
| <b>Plug</b>       |           |                               |
| JL751a            | 25055628Y | NPLG-7P590                    |
| <b>Socket</b>     |           |                               |
| JL752a            | 25051090Y | NSCT-6P877                    |

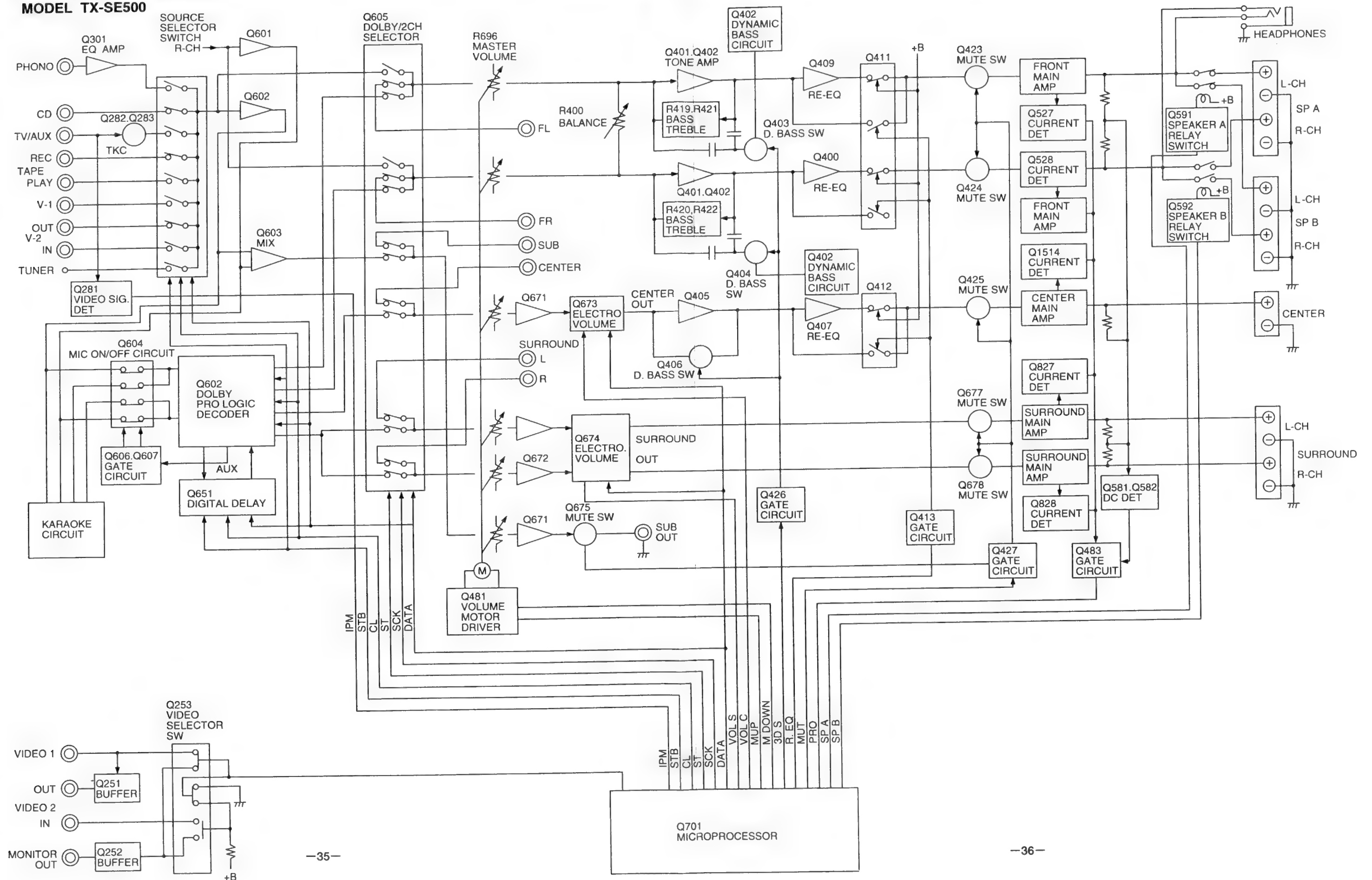
**NOTE:** <D>:120V model only  
<P>:230V model only  
<W>: Asian model only  
<T>: Taiwanese model only  
<A>: Australian model only  
<K>: Korean model only  
<SE>: TX-SE500 only

# BLOCK DIAGRAM

MODEL TX-SV444

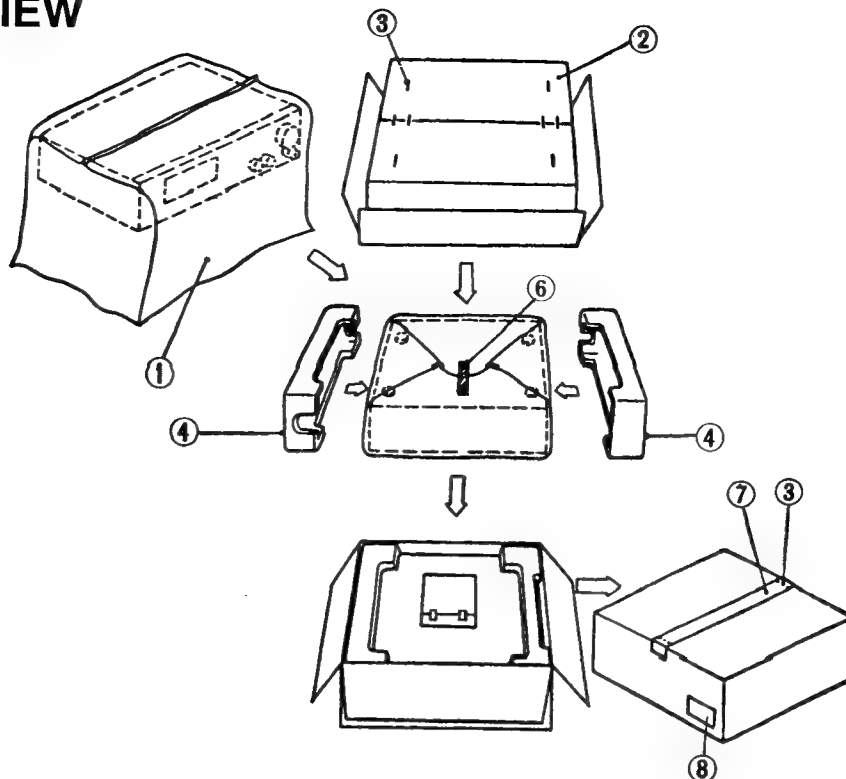


# BLOCK DIAGRAM MODEL TX-SE500





# PACKING VIEW



## MODEL TX-SV444

| REF. NO. | PART NO.     | DESCRIPTION                    |
|----------|--------------|--------------------------------|
| 1        | 29100034-1AY | 850x650, Poly bag              |
| 2        | 29053089Y    | Carton box <D>                 |
| 2        | 29053090AY   | Carton box <A/K/T/W>           |
| 2        | 29053091Y    | Carton box <P>                 |
| 3        | 282321       | Staple                         |
| 4        | 29091763AY   | Pad ass'y                      |
| 6        | 261504       | Paper tape                     |
| 7        | 29110071     | P. P tape                      |
| 8        | 29362093Y    | Label EAN <P>                  |
|          | 232140       | NMA-3057, AM loop antenna      |
|          | 3010054      | UM-3, Battery                  |
|          | 24140327Y    | RC-327S, Remote control        |
|          | 25055018     | CV-1K-1, Conversion plug <W>   |
|          | 25065462Y    | YAE21-0237, FM adaptor <K/A/T> |
|          | 29100097-1AY | 350x250, Poly bag              |
|          | 292111Y      | FM antenna <D>                 |
|          | 292112Y      | FM antenna <P/K/A/T/W>         |
|          | 29342375Y    | Instruction manual E           |
|          | 29342376Y    | Instruction manual FSI <P>     |
|          | 29342377Y    | Instruction manual GSWD <P>    |
|          | 29342378Y    | Instruction manual T <T/W>     |
|          | 29358002K    | Service station list <D>       |
|          | 29361786Y    | Label <K/A/W>                  |
|          | 29365019B    | Warranty card <D>              |

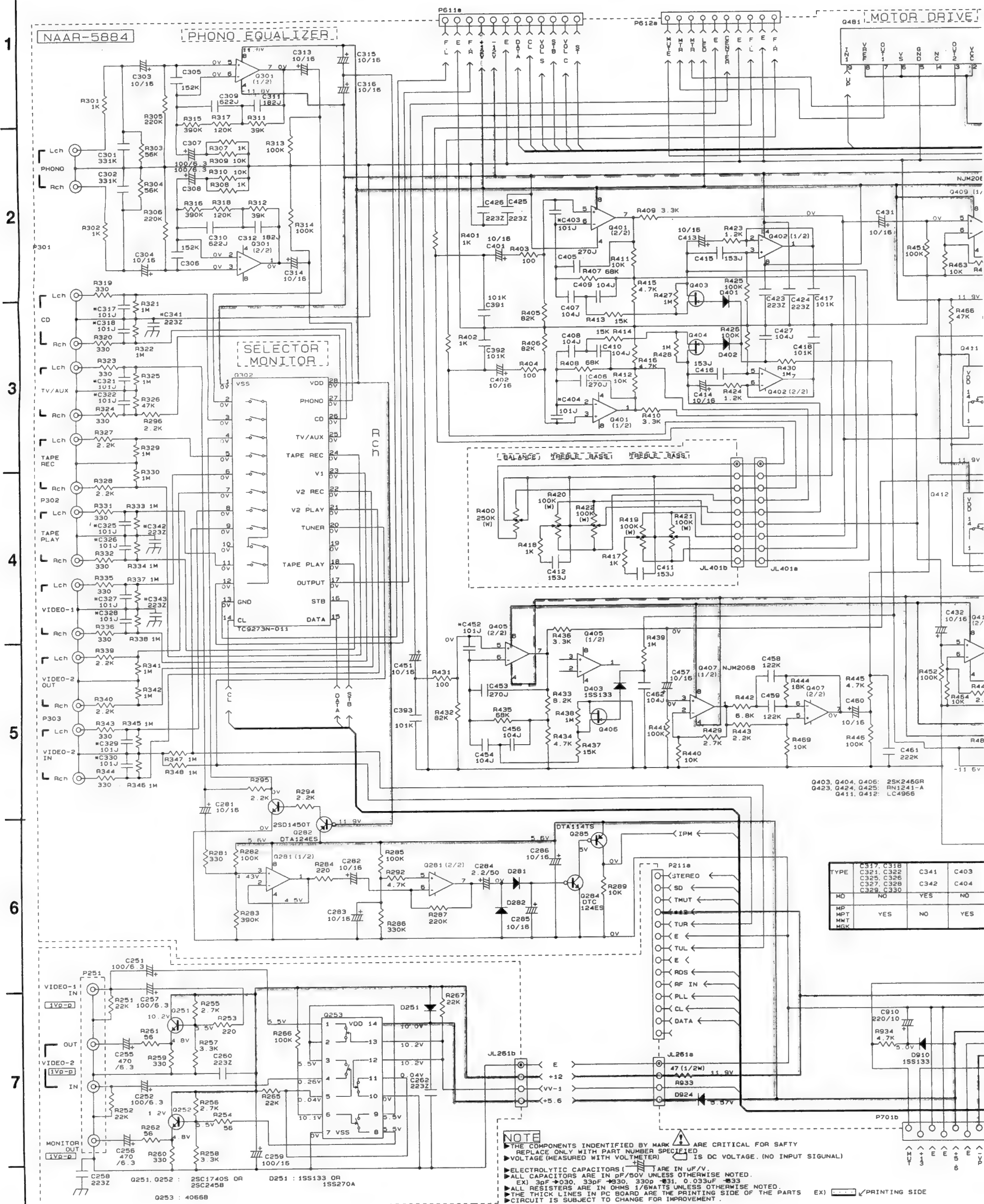
NOTE: <D>:120V model only  
 <P>:230V model only  
 <W>:Taiwanese model only  
 <A>:Australian model only  
 <T>:Asian model only  
 <K>:Korean model only

## MODEL TX-SE500

| REF. NO. | PART NO.            | DESCRIPTION                |
|----------|---------------------|----------------------------|
| 1        | 29100034-1AY        | 850x650, Poly bag          |
| 2        | 29053092Y           | Carton box <B>             |
|          | 29053146Y           | Carton box <G>             |
| 3        | 282321              | Staple                     |
| 4        | 29091763AY          | Pad ass'y                  |
| 6        | 261504              | Paper tape                 |
| 7        | 29110071            | P. P tape                  |
| 8        | 29362094Y           | Label EAN <B>              |
|          | 29362134Y           | Label EAN <G>              |
|          | Accessory bag ass'y |                            |
|          | 24140326Y           | RC-326S, Remote control    |
|          | 3010054             | UM-3, Battery              |
|          | 232140              | NMA-3057, AM loop antenna  |
|          | 292112Y             | FM antenna                 |
|          | 25065462Y           | YAE21-0237, FM adaptor     |
|          | 29342375Y           | Instruction manual E       |
|          | 29342378Y           | Instruction manual T <P/W> |
|          | 29355221Y           | Instruction sheet          |
|          | 25055018            | CV-1K-1, CV Plug           |
|          | 29100097-1AY        | 350x250, Poly bag          |

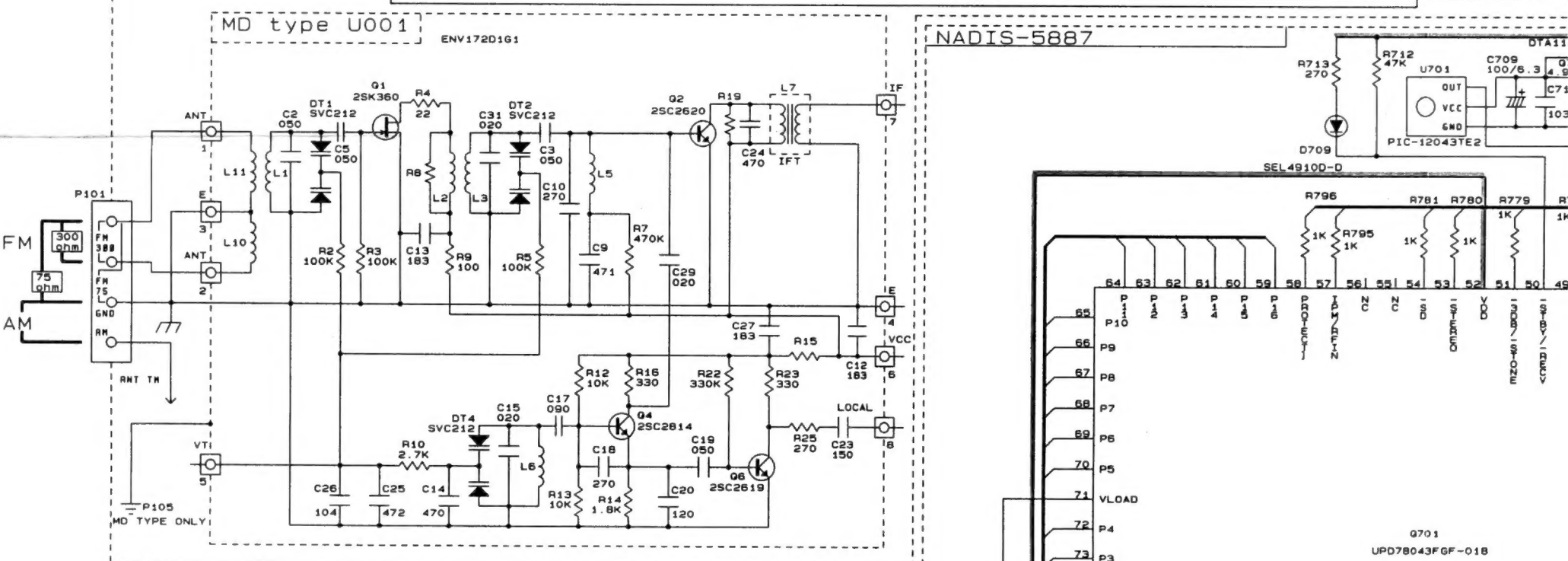
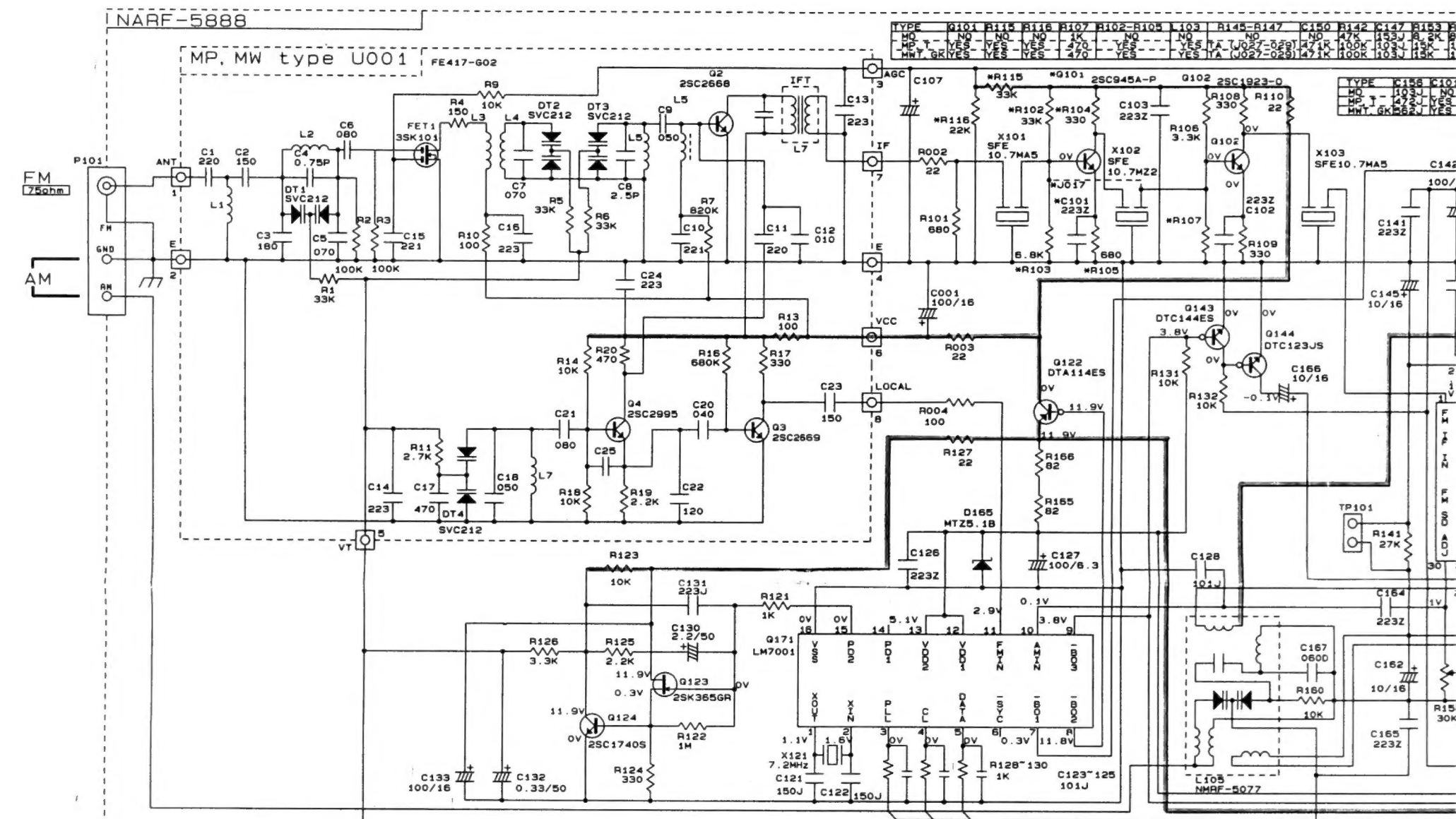
NOTES: <B>: Black model only  
 <G>: Golden model only  
 <P>: Asian model only  
 <W>: Taiwanese model only  
 <K>: Korean model only

## SCHEMATIC DIAGRAM 1/3



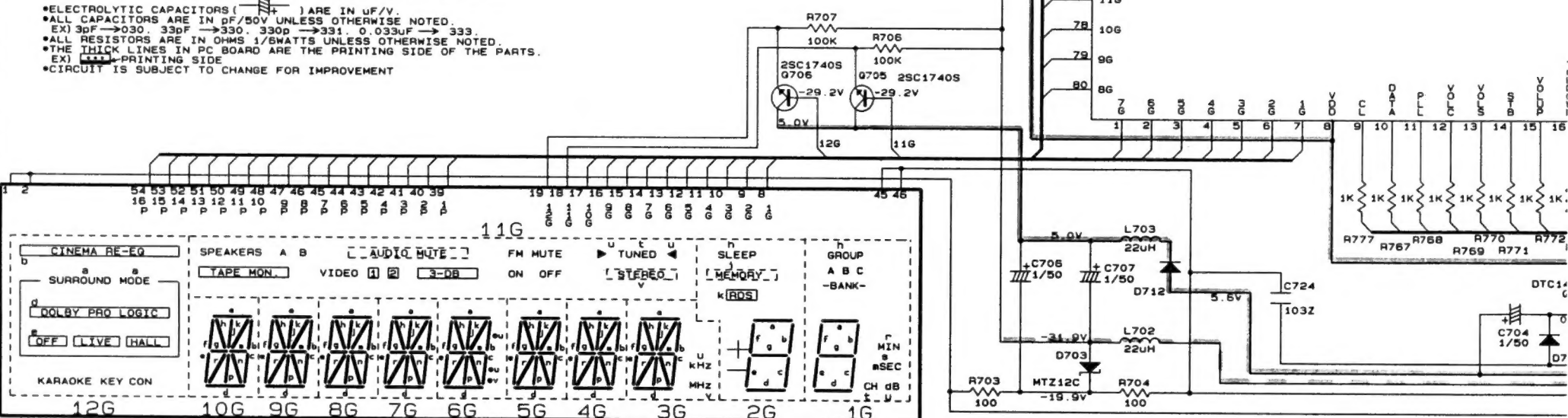


# SCHEMATIC DIAGRAM 2/3

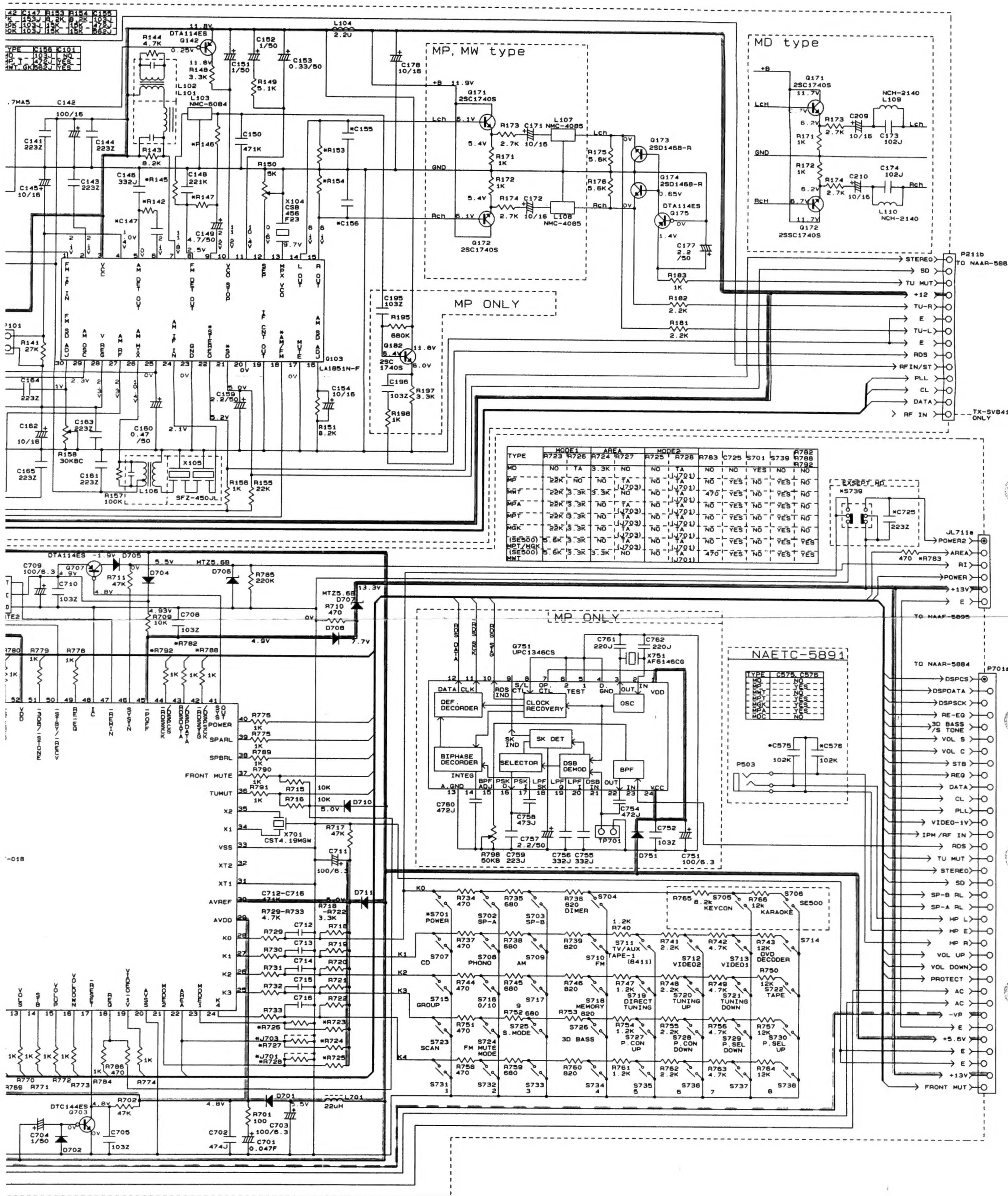


## NOTE

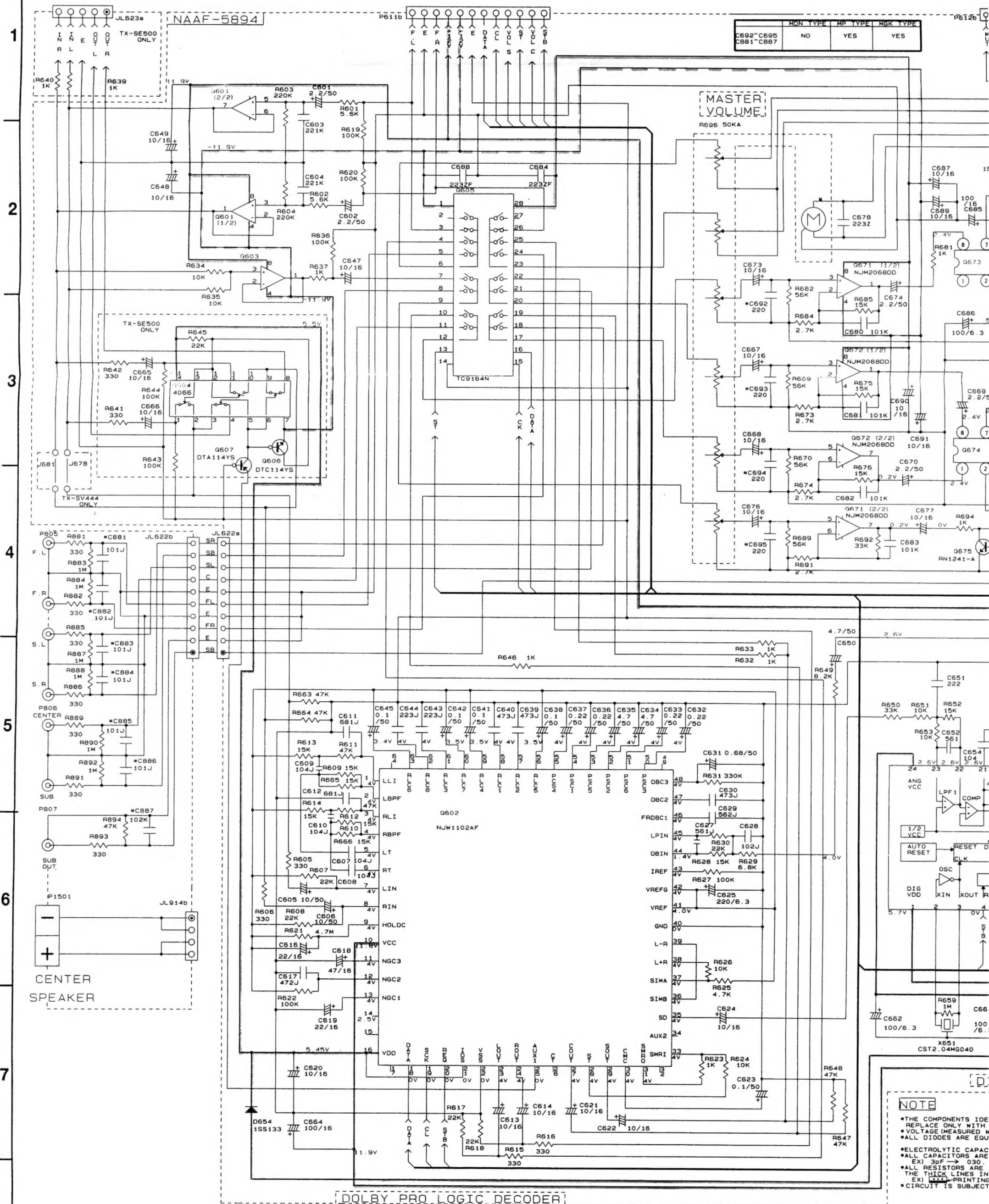
- THE COMPONENTS IDENTIFIED BY MARK ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE (MEASURED WITH VOLTMETER) IS DC VOLTAGE. (NO INPUT SIGNAL)
- ALL DIODES ARE EQUIVALENT TO 1N5133 UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS ( ) ARE IN  $\mu F/V$ .
- ALL CAPACITORS ARE IN  $pF/50V$  UNLESS OTHERWISE NOTED.
- EX)  $30pF \rightarrow 0.030$ ,  $330pF \rightarrow 0.330$ ,  $3300pF \rightarrow 3.3$ ,  $0.033\mu F \rightarrow 333$ .
- ALL RESISTORS ARE IN OHMS  $1/5W$  UNLESS OTHERWISE NOTED.
- THE THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS.
- EX) PRINTING SIDE
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT



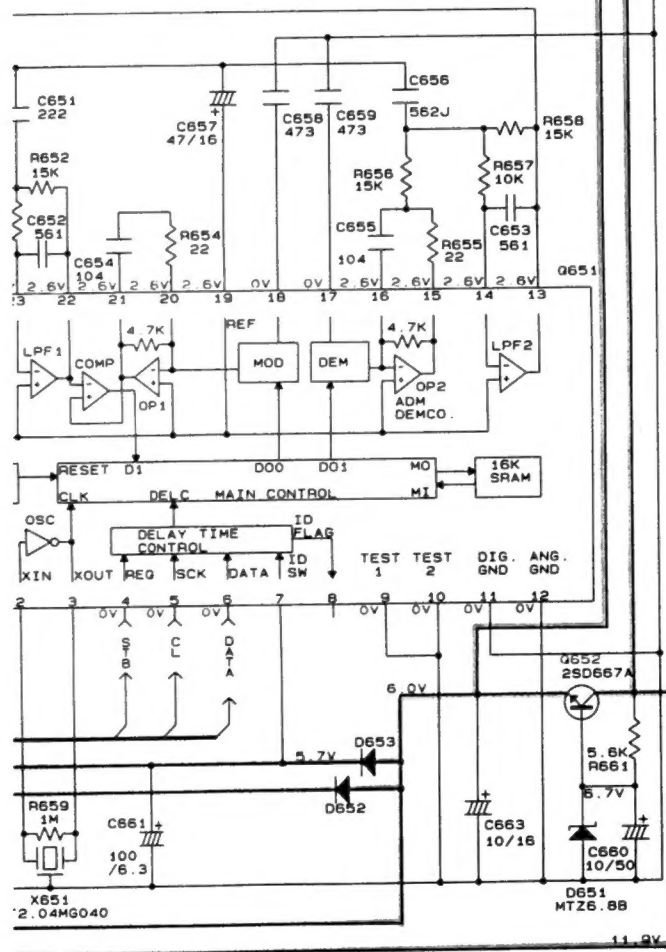







# SCHEMATIC DIAGRAM 3/3

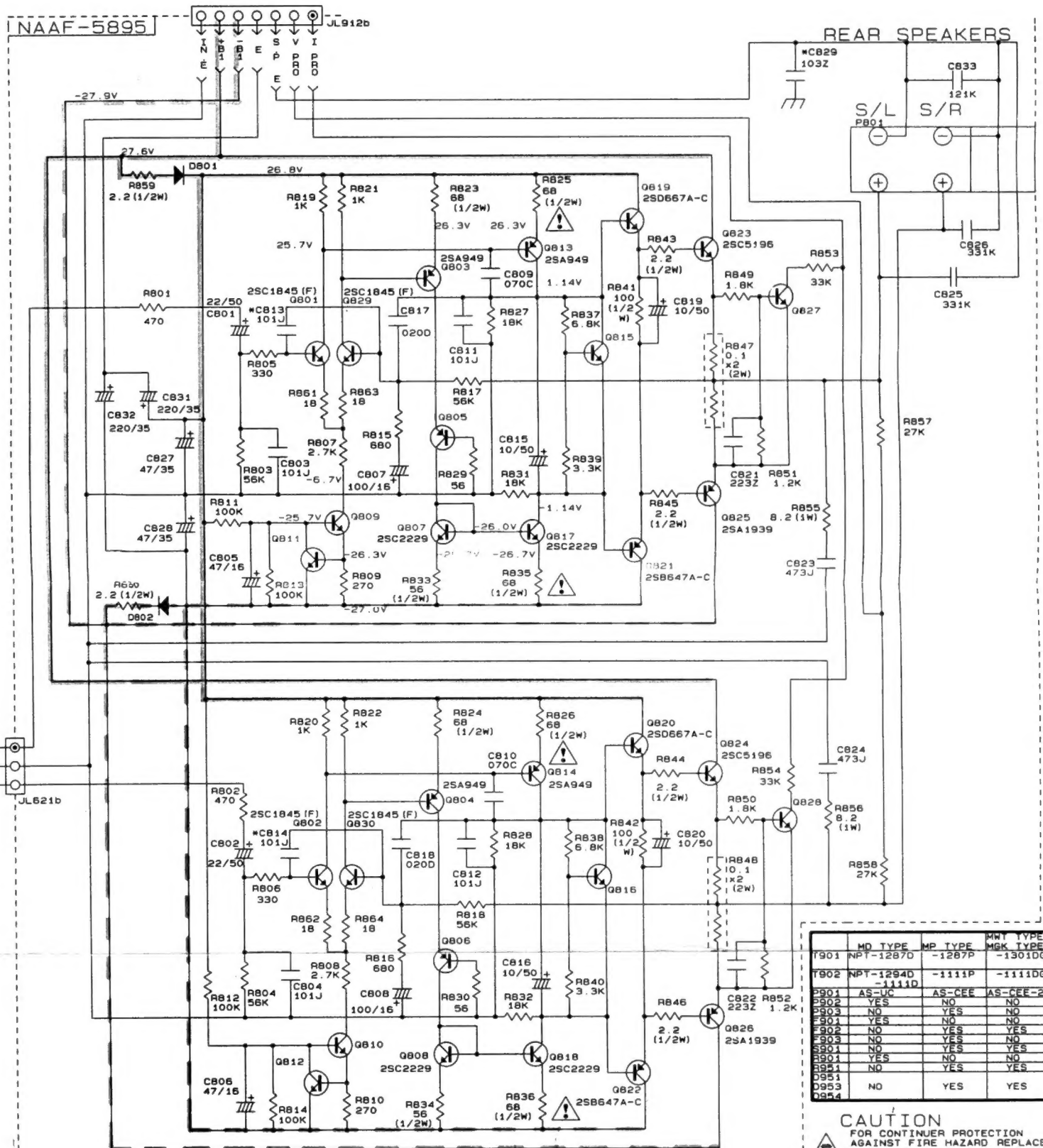






## [ DIGITAL DELAY ]


 COMPONENTS IDENTIFIED BY MARK  ARE CRITICAL FOR SAFETY.  
 CE ONLY WITH PART NUMBER SPECIFIED.  
 (MEASURED WITH VOLTMETER) IS DC VOLTAGE. (NO INPUT SIGNAL).  
 CODES ARE EQUIVALENT TO 15S133 UNLESS OTHERWISE NOTED.  
 POLYESTER CAPACITORS (  ) ARE IN uF/V.  
 CAPACITORS ARE IN pF/50V UNLESS OTHERWISE NOTED.  
 3pF → .030. 33pF → .330. 330pF → .331. 0.033uF → .333.  
 RESISTORS ARE IN OHMS / SWATTS UNLESS OTHERWISE NOTED.  
 THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS.  
 PRINTING SIDE  
 IT IS SUBJECT TO CHANGE FOR IMPROVEMENT.



|      | MD TYPE  | MP TYPE  | MNT TYPE |
|------|----------|----------|----------|
|      | MP1 TYPE | MP2 TYPE | MP3 TYPE |
| T901 | -1287D   | -1287P   | -1301D6  |
| T902 | -1284D   | -1111P   | -1111D6  |
| P901 | AS-UC    | AS-CEE   | AS-CEE-2 |
| P902 | YES      | NO       | NO       |
| P903 | NO       | YES      | NO       |
| P904 | YES      | NO       | YES      |
| P905 | NO       | YES      | YES      |
| P906 | NO       | YES      | YES      |
| P907 | NO       | YES      | YES      |
| P908 | NO       | YES      | YES      |
| P909 | YES      | NO       | NO       |
| P910 | NO       | YES      | YES      |
| D951 |          |          |          |
| D952 |          |          |          |
| D953 | NO       | YES      | YES      |
| D954 |          |          |          |

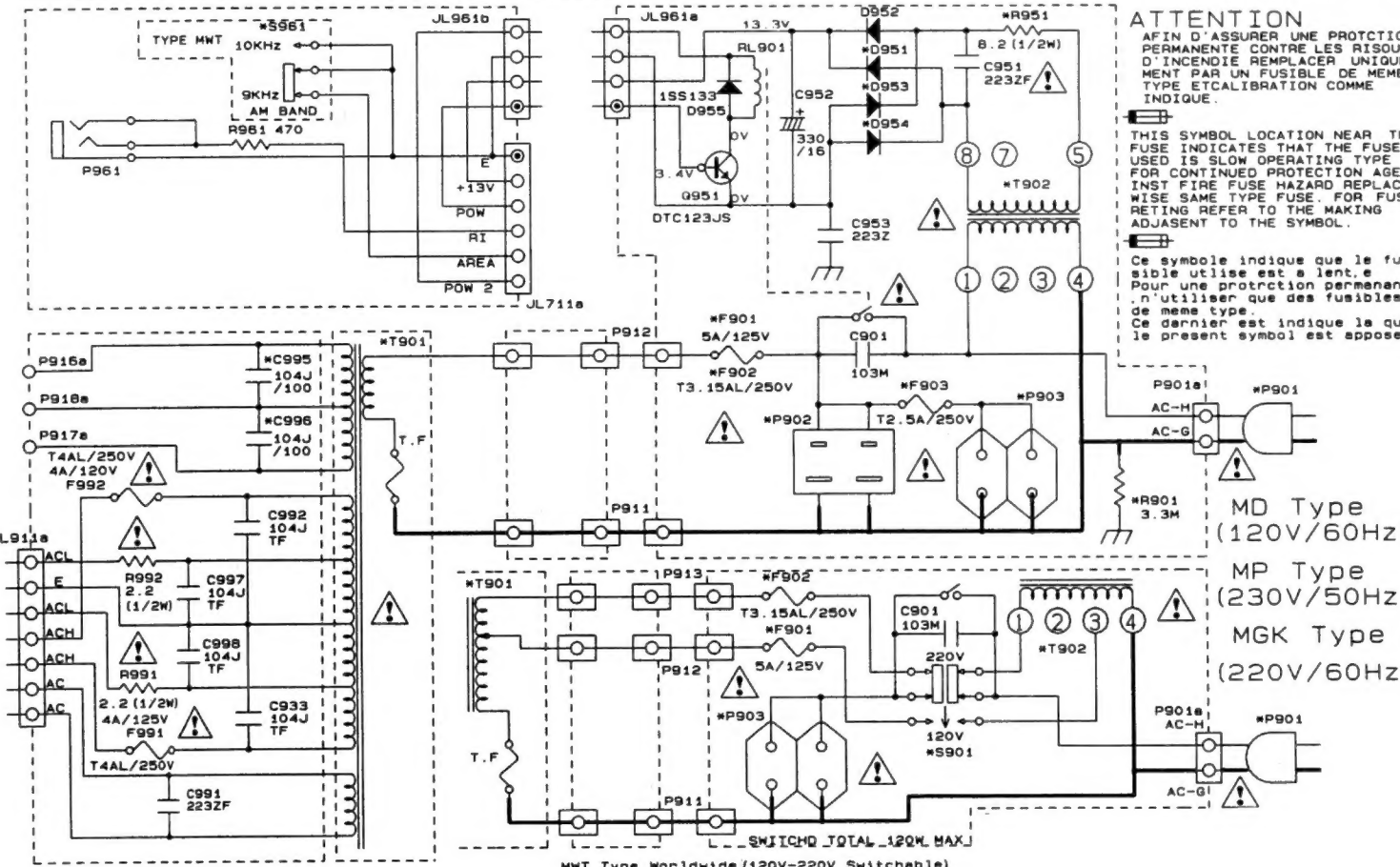
**CAUTION**  
FOR CONTINUER PROTECTION  
AGAINST FIRE HAZARD REPLACE  
ONLY WITH FUSE OF SAME TYPE  
AND RATING INDICATED.

## ATTENTION

AFIN D'ASSURER UNE PROTECTION  
PERMANENTE CONTRE LES RISQUES  
D'INCENDIE REMPLACER UNIQUE-  
MENT PAR UN FUSIBLE DE MEME  
TYPE ET CALIBRATION COMME  
INDIQUE.

THIS SYMBOL LOCATION NEAR THE FUSE INDICATES THAT THE FUSE USED IS SLOW OPERATING TYPE FOR CONTINUED PROTECTION AGAINST FIRE FUSE HAZARD REPLACE WITH SAME TYPE FUSE. FOR FUSE RETING REFER TO THE MAKING ADJASANT TO THE SYMBOL.

Ce symbole indique que le fusible utilise est a lent,e  
Pour une protection permanent  
,n'utiliser que des fusibles d  
de meme type.  
Ce dernier est indique la qu  
le present symbol est appose.



MD Type  
(120V/60Hz)  
MP Type  
(230V/50Hz)  
MGK Type  
(220V/60Hz)

WMT Type Worldwide (120V-230V Switchable)